TAMPERE UNIVERSITY OF TECHNOLOGY
Degree Programme in Industrial Engineering and Management

VILLE PURHONEN

ENGAGING BUSINESS USERS TO BUSINESS INTELLIGENCE COMPETENCY CENTER

Master of Science Thesis

Prof. Tuomo Peltonen has been appointed as the examiner at the Council Meeting of the Faculty of Business and Technology Management on June 16, 2010.

ABSTRACT

TAMPERE UNIVERSITY OF TECHNOLOGY
Master's Degree Programme in Industrial Engineering and Management

PURHONEN, VILLE: Engaging Business Users to Business Intelligence Competency Center
Master of Science Thesis, 69 pages, 2 appendices
August 2010
Major: Industrial management
Examiner: Professor Tuomo Peltonen
Keywords: Business Intelligence Competency Center, Business Intelligence, engaging, business users, resistance to change

This thesis deals with the engagement of business users to Business Intelligence Competency Center (BICC). The concept of BICC is still relatively young and it has not been researched a lot. The benefits and the downsides of BICC presented in the existing literature are also related to the engagement of business users to this more centralized Business Intelligence (BI). New centralized BI offers different means and methods but it also sets up different challenges considering the engagement.

The main objective of this thesis was to find out different means and methods to engage business users to Business Intelligence Competency Center. The research was conducted as applied case research on an assignment and it was focused on solving real practical problems in the case environment. The qualitative research material was based on the observations and the interviews of two different BI solution development cases. The analysis of the research material was built on two descriptive narratives and their categorization and summarization.

The results of this research show that the means and the methods of engaging business users to BICC are familiar from the existing change management literature. However, the importance of BI solution's superiority was notable compared to other ways of engagement. Also the timing of introducing superior BI solution did not make any difference in engagement as opposed to the indications of the existing literature. The research also indicated that as the maturity of BICC increases the means and methods of engagement should also change considering increased coverage and standardization, and the dilution of personal touch. Also conducted research brought out different challenges considering the engagement of business users to centralized BICC. As a conclusion, this thesis is able to give managers a good overall understanding of engaging business users to BICC. They can achieve better engagement with less effort and consider how the characteristics of their own environment affect on the engagement. For academics this research works as an opening for further research related to engaging business users to Business Intelligence Competency Center.

TIIVISTELMÄ

TAMPEREEN TEKNILLINEN YLIOPISTO
Tuotantotalouden koulutusohjelma

PURHONEN, VILLE: Bisneskäyttäjien sitouttaminen liiketoimintatiedon hallinnan osaamiskeskukseen
Diplomityö, 69 sivua, 2 liitettä
Elokuu 2010
Pääaine: Teollisuustalous
Tarkastaja: professori Tuomo Peltonen
Avainsanat: liiketoimintatiedon hallinnan osaamiskeskus, BICC, liiketoimintatiedon hallinta, sitouttaminen, bisneskäyttäjät, muutosvastarinta

Tämä työ käsittelee bisneskäyttäjien sitouttamista liiketoimintatiedon hallinnan osaamiskeskukseen (BICC). Käsitteenä BICC on vielä suhteellisen nuori eikä aihealuetta ole tutkittu paljoa. BICC:tä käsittelevässä kirjallisuudessa esitetyt hyvät ja huonot puolet liittyvät myös bisneskäyttäjien sitouttamiseen keskitettyyn liiketoimintatiedon hallintaan (BI). Uusi, keskitetty liiketoimintatiedon hallinta tarjoaa erilaisia välineitä ja keinoja, mutta se myös asettaa erilaisia haasteita sitouttamiselle.

Tämän työn päätavoitteena oli löytää erilaisia välineitä ja keinoja, joilla bisneskäyttäjiä voidaan sitouttaa liiketoimintatiedon hallinnan osaamiskeskukseen. Tutkimus toteutettiin soveltavana casetutkimuksena toimeksiantona ja se keskittyi todellisten ongelmien ratkaisemiseen caseympäristössä. Kvalitatiivinen tutkimusaineisto pohjautui kahteen BI-ratkaisun kehityscaseen liittyviin haastatteluihin ja havaintoihin. Tutkimusaineiston analyysi rakentui kahden kuvailevan tarinan ja aineiston kategorisoinnin ja tiivistyksen varaan.

Tutkimuksen tulokset osoittavat että bisneskäyttäjien sitouttamisen välineet ja keinot ovat tuttuja jo olemassa olevasta muutosjohtamisen kirjallisuudesta. Kuitenkin BI-ratkaisun ylivertaisuuden merkitys oli huomattavaa verrattuna muihin sitouttamisen keinoihin. Myös ylivertaisen BI-ratkaisun esittelyn ajoituksella ei havaittu olevan merkitystä sitouttamisen kannalta toisin kuin olemasa oleva kirjallisuus esittää. Tehty tutkimus myös osoitti, että BICC:n iän kasvaessa myös sitouttamisen välineet ja keinot tulisi muuttua huomioiden BICC:n kasvaneen kattavuuden ja standardisoinnin sekä henkilökohtaisen otteen vähenemisen. Lisäksi tehty tutkimus toi esiin erilaisia haasteita, jotka liittyvät bisneskäyttäjien sitouttamiseen BICC:hen. Yhteenvetona tämä tutkimus tarjoaa johtajille kattavan katsauksen loppukäyttäjien sitouttamisesta, jotta he voivat saavuttaa paremman sitoutumisen vähemmällä vaivalla ja pohtia, kuinka heidän oman ympäristönsä vaikuttaa loppukäyttäjien sitouttamiseen. Akateemikoille tämä tutkimus toimii puolestaan päänavauksena tuleville tutkimuksille kyseisestä aiheesta.

PREFACE

Things don't go as planned. Before I jumped at the chance of the assignment of this thesis I was quite sure that my thesis' topic would cover management accounting in a way or another. But no, I found myself in the jungle of change management and Business Intelligence, themes that I was not earlier familiar with at all.

Despite the leap into the unknown my whole master's thesis process could be described painless and even smooth when I regard it afterwards. I would like to express my deepest gratitude for this to my supervisor, Ville Koskela, who not only put the initiative for this research but also had time for my numerous questions during the whole five-month process. His constant drive helped me to wrap up this thesis faster than I expected. Thanks belong also for my other colleagues and partners at Metso Automation who shared their expertise with me.

I would also like to thank the examiner of this thesis, Professor Tuomo Peltonen, for his time and valuable ideas and comments. Although this thesis was also his very first at Tampere University of Technology, the guidance was excellent and it did not let me to take the easiest way out. Last but not least I would like to show my gratitude to my dear friends and family who have always stood by me whenever I've needed you.

Tampere, 10th of August 2010

Ville Purhonen

TABLE OF CONTENTS

ABBREVIATIONS AND NOTATION

BI	Business Intelligence
BICC	Business Intelligence Competency Center
BRT	Metso Automation's Business Reporting Team
DW	Data Warehouse / data warehousing
EET	Metso's Energy and Environment Technology segment
ETL	Extract, transform, and load. Process of data warehousing.
FC	Flow Control, Metso Automation's Business Unit
GBI	Metso Automation's global Enterprise Resource Planning project
KPI	Key Performance Indicator
MA	Metso Automation, Metso's Business Line
OLAP	Online Analytical Processing
PAS	Process Automation Systems, Metso Automation's Business Unit

1. INTRODUCTION

1.1. Towards centralized Business Intelligence

The importance of knowledge for the companies of today is undeniable. It is generally acknowledged that knowledge is one of the most important resources of a company (i.e. Prahalad & Hamel 1990; Kogut & Zander 1992; Quinn 1992; Conner & Prahalad 1996). The long-term and the strategic importance of knowledge are especially highlighted: According to Prahalad and Hamel (1990) knowledge can be a source of sustainable competitive advantage. Quinn (1992) as well emphasizes that organizations and their strategies are more dependent on the development and the deployment of intellectual resources than physical assets. It seems that high-quality information has become a recognized asset that today's enterprises cannot do without. (Chew et al. 2007.)

Despite the recognized importance of knowledge, many companies have been unable to exploit massive amounts of surrounding information in a satisfactory level. To handle this issue, companies have invested a lot in Business Intelligence (BI) implementations during the last years. (Chew et al. 2007.) In a nutshell, the goal of Business Intelligence is to get the right information to the right people at the right time to enhance more effective decision-making (Miller et al. 2006, p 3). Business has become even more dependent on these solutions and new information systems as competition has tightened (Feeny & Willcocks 1998). The current trend has been to deploy BI more broadly across the organization to meet the demand of information (IBM 2009b).

However, in most cases there have been only a little or no coordination at all between different BI implementations in organizations. This has resulted in shattered and multiple local solutions. In these cases IT departments have been challenged to manage and support all new tools and needed capabilities across the organizations. The economies of scale have not realized and also the data quality has suffered which has weakened the possibility of utilizing corporate-wide Business Intelligence. Also BI development projects have been overlapping and there has been very little sharing of best practices. (IBM 2009b.) According to Hitachi (2009), companies may receive some benefits from their departmental BI solutions, but there are significant challenges in making a larger, strategic impact.

There is a clear need for more coherent BI throughout the organizations. In the beginning of 21st century, Business Intelligence Competency Center (BICC) has been an answer to this question in many organizations. Miller et al. (2006, p. 9) defines a

BICC as “a cross-functional team with a permanent, formal organizational structure”. The goal of BICC is to support and promote the effective use of Business Intelligence across an organization (Miller et al. 2006). BICC implementations has been done to reduce the total costs of ownership and to reach more effective BI implementations. These goals require more centralized decision-making and standardizations in the field of BI. (Cognos 2006.) According to researches done, BICC implementations have been relatively successful and answered to the requirements set on it. Also the number of BICC implementations has been increasing. (Computerworld 2006; BARC 2008.)

Although Business Intelligence Competency Centers are boosting the outcomes of BI solutions in organizations, the concept has also its downsides. Increased standardization and centralized coordination decreases the flexibility of business users considering BI solutions. If the bureaucracy is high and there is little chance to adjust centralized solutions to own needs, some departments with special needs may end up not having their own crucial information or reports anymore. Also more centralized solutions may decrease the overall commitment. To get the most out of the Business Intelligence, business users of BI need to be engaged to this new concept of centralized and more standardized BI. The question is how Business Intelligence Competency Centers can enhance the engagement of business users despite reduced flexibility to get a flying start and leave the incoherent departmental solutions behind?

1.2. Research problem, objectives and limitations

Business Intelligence Competency Center is relatively young concept, which is why it has not been covered extensively in the existing literature. Only few researches and questionnaires have been made focusing mostly on the diffusions of BICCs and how they are managed in companies. Some literature exists about the obstacles of implementing a BICC but there is a lack of information available about how the business users, who are the decision-makers and who should be behind the initiatives of BI actions, deal with the Business Intelligence’s organization change towards more centralized model.

It seems obvious that change resistance arises when Business Intelligence solutions are centralized and earlier autonomous departments lose their flexibility and freedom due to increased standardization and bureaucracy. However, there are a lot of opportunities and media to dilute this resistance to change by engaging users during BI development projects and during the kick-off of Business Intelligence Competency Center. The research problem and objectives are derived from the needs of both literature and also from the needs of the case company who put the initiative for this research.

The main research question of this thesis is:

1. How to engage business users to Business Intelligence Competency Center?

Other research questions can be written:

2. How the means and the methods of engagement change as company moves towards centralized BICC?

3. What are the main challenges considering the engagement of business users to BICC?

The objective number one is to find different methods and means to overcome the resistance of change and therefore enhance business users' engagement to Business Intelligence Competency Center. The variety of different ways is huge if we consider organizational change management and engagement in general, but in case of BICC some ways may be limited due to the organization itself and vice versa some ways may be BICC specific. Because the research material is based on two separate but almost identical BI development projects by their scope, there is a chance to compare how the means and methods have changed as the company has moved towards more centralized BICC between the projects. The objective of this kind of comparison is to bring out possible advantages and disadvantages of BICC and therefore be more exploratory by the nature. The third research question's objective is to find challenges related in business user engagement focusing on BI development projects. Decreased flexibility and increased standardization have been highlighted in the literature but there has been only a little empirical evidence how they really affect on the business users' commitment and engagement.

Because particular case organization's Business Intelligence solutions and Business Intelligence Competency Center organization are young, this research comes a little short considering the day-to-day work of BICCs which is followed after BI solution development projects. Some observations can be made on the basis of another project but the research focuses mainly on the moment of the execution of two BI solution development projects. The developed BI solutions, their informative value to business users and related BI tools are discussed shortly leaving their functionalities and the technical side of the solutions outside the scope. Another limitation is related to the field of social science research. Although people's mutual interactions and relationships are important considering change resistance and people's organizational engagement, these are delimited outside this thesis due to the field of this study and the competence of the researcher.

1.3. Research methodology

This research is made on an assignment of the case company, Metso Automation. During the research process the researcher was a member of the case company and took part in organization's daily work. This practical problem solving created a basis for more applied research which targets on creating a solution to a real problem. According

to almost 20 year-old text by Kasanen et al. (1993), this kind of setting has been quite typical to Master of Science theses in Finland's technical universities. Kasanen et al. (1993) calls this constructive research approach according to the construction which is created to solve a real practical problem. They also put that "problem's practical relevance" is one of the main part of constructive research (Kasanen et al. 1993, p. 306). However, the construction created in this thesis differs a little from typical normative constructions being also a little descriptive due thesis topic's relative young age.

In this thesis case research is used as main research method which is very typical to constructive research which aims to creating a certain construction (Kasanen et al. 1993, p. 315). According to Yin (2009) case study is relevant method when there is a need to explain things and answer "how" or "why" questions. Tellis (1997) put that case study has three tenets of the qualitative method: describing, understanding and explaining. The case approach can give extensive and in-depth description, which is good because the concept of Business Intelligence Competency Center is relatively young and it has not been researched intensively. Because many things are unique and complex in organizational issues as well, true understanding of these phenomena requires a close and holistic view, and especially in-depth view is crucial to create a problem solving construction. Although the research field of sociology is usually associated strongly with case study research, it fits well on this thesis' context of organizational change as well. (Tellis 1997; Yin 2009.)

This case research focuses on two different BI development projects of one business line of a large corporation. According to Yin's (2009) typology of case researches this research is called holistic multiple-case research because two different cases are studied in one unit. Because Business Intelligence Competency Center is relatively young in case organization, chance is likely to occur in it during the research which makes the environment quite dynamic. Also, the researcher is a member of the organization at the time of research so it is not clear how researcher's intervention is promoting the practices within the organization. It is important to be aware of these features of action or interventionist research. However, being part of the organization gives a good access to data and a good knowledge how the organization is really functioning. This combined to long and close observation gives a great change to get rich qualitative data. (Saunders et al. 2009.) Although observation is an important way of collecting the material of case research, the first case description of BI solution development project from the time of its planning and execution is needed to be done only on the basis interviews and documentation without any observation. However, being part of organization created a chance to establish trust between members of organization and therefore to obtain rich information through interviews as well. The material of the further engagement of business users after the first project's execution and the material from the whole second project are obtained mainly by observing.

The goal of this research is not to construct totally new theory, which would describe the particular phenomenon in general. This kind of basic research would require more cases and comparison between them, or even totally different research method (Eisenhardt 1989). Vice versa, this thesis is more applied research and therefore the goal is to create a construction to the managers and to have a dialog with the theory suggesting possible expansions or adjustments on it based on the research material. Focusing intensively on two similar cases gives also a possibility to tell a 'good story' based on rich qualitative which could be utilized in further researches covering the same topic.

1.4. The structure of the thesis

According to Kasanen et al. (1993), the structure of this thesis follows quite well the typical structure of the constructive researches done in diploma works: phrasing a question, literature review, solving a real problem in case company and creating a construction, and summary. The structure is visualized in Figure 1.1.

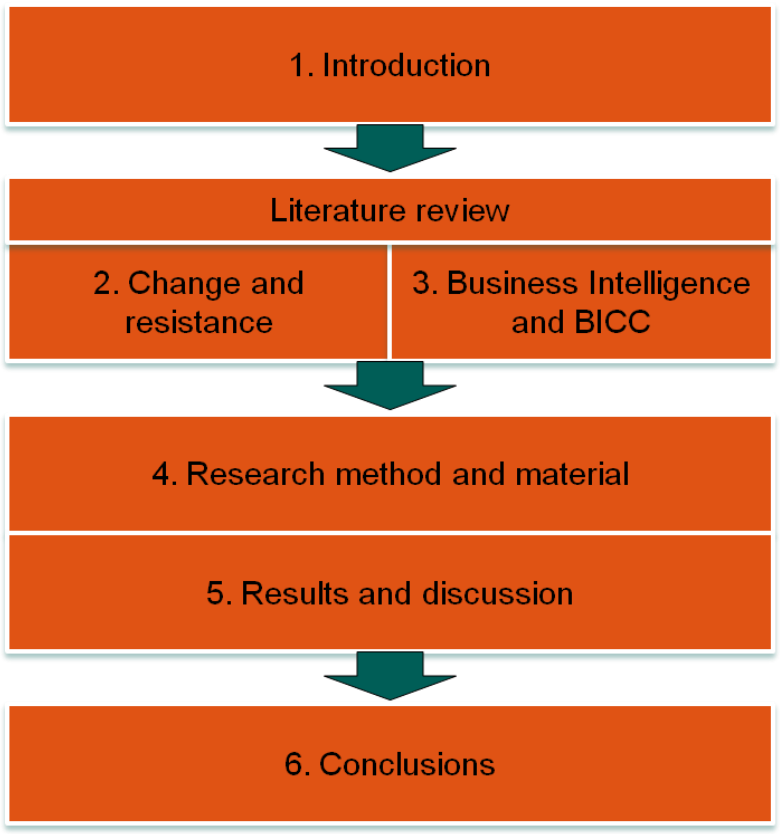

Figure 1.1: The structure of the thesis.

The introduction is followed by two chapters of literature review, which create basis for both obtaining and processing of research material. The chapter number 2 consists of the theory of organizational change and organization change resistance. Different theoretical frameworks are presented to cover an organizational change and also some

models of change management and how to overcome change resistance are reviewed to get the reflection surface for the empirical research material.

In the beginning of the chapter 3 the basics of Business Intelligence is reviewed to create a sound understanding for the rest of the chapter and the thesis. After presenting BI in a nutshell, chapter 3 focuses on the Business Intelligence Competency Center concept. After introducing the concept of BICC, the functioning and the typical roles of a BICC are presented to create an understanding how and who are dealing with BI solutions and their development projects. In the end of chapter 3 the organization and organizational alignment of a BICC are discussed.

Next, the fourth chapter is dedicated to the research method and the collection of research material. First, the methods of obtaining and analyzing the research material are presented and discussed. The rest of the chapter focuses on presenting the case company and its environment. Next chapter deals the results of the research. Two descriptive narratives are built after which the second research question is discussed. Next the research material is categorized and summarized on which basis the first and the third research questions are answered and discussed. The empirical material discussed reflecting it to the existing theory and the validity and reliability of the research is discussed. In the end, the conclusions are drawn and possible future research suggestions are made.

2. CHANGE AND RESISTANCE

2.1. Change in organizations

2.1.1. Organizational change

It would be wrong to claim that the companies of today are dealing in a totally new dynamic environment where change occurs. Change is not a new thing, it has always been present. However, it is undeniable that the competition has tightened and the pressure for companies to adapt and renew has increased. The change and the change management became more popular and significant topics in the 1980s when more pressure was put to both private- and public-sector organizations in order to survive. Many corporate do change, at least they try, but some do not manage to do it. (Barr et al. 1992; Yukl 2001; Robbins 2003.)

In a nutshell, change can be defined as making things different (Robbins 2003). Pardo del Val and Martinez Fuentes (2003, p. 148) put that "organizational change is an empirical observation in an organizational entity of variations in shape, quality or state over time, after the deliberate introduction of new ways of thinking, acting and operating". This definition of the organizational change fits well in the theme of this thesis, because the change is intentional and especially it covers the introduction of new ways. Also, the definition of intentional change usually includes an idea that change has a specific goal (Robbins 2003). However, some levels of change occur in organizations even if they are not planned beforehand or even they are not intended at all. These incautious changes are limited outside this thesis although in the most of the cases they are as important as deliberate changes.

There are different reasons behind deliberate organizational changes. An ever-changing environment forces companies to adapt themselves. For example, different changes in legislation and edicts force companies to change their processes and adjust themselves to be able to continue their operating. Other and the most typical initiative for organizational change can be set from the behalf of the owners: companies need to improve their performance. Good and recognized examples of performance improvement changes are the multiple quality programs started in the 1990s by the western car manufacturers. The reason behind these quality programs was the improved quality of Japanese car manufacturers which had become a significant competitive advantage. Naturally, every improvement changes are not catch-ups but many companies try to create new competitive edge for example by launching new products or by developing new Business Intelligence solutions to enhance better decisions.

Underlying reasons for incautious changes are quite the same, however, their initiative lies somewhere in the subconscious. (Barr et al. 1992; Boeker 1997.)

Robbins (2003, p. 556) has listed comprehensively six types of forces that drive for change: nature of the workforce, technology, economic shocks, competition, social trends and world politics (Figure 2.1). Each of these may force company to adjust themselves to be able to continue operating or each of these may be an initiative for companies to improve their performance.

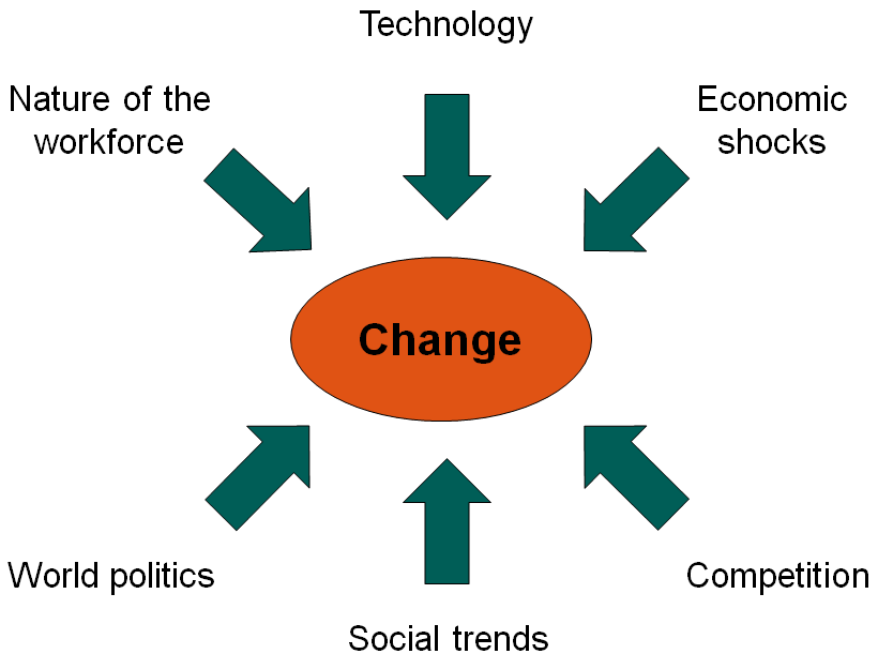

Figure 2.1: Forces for change (Robbins 2003, p. 556).

The nature of the workforce has changed quite a lot during the last decades. In the western countries, the cultural diversity has increased due to the intensive immigration. Also the workforce has specialized even more which has increased the number of professional employees. The nature of the workforce has also changed in developing countries where the level of education has increased. In addition to the change in the nature of the workforce technology has been, and will be a significant and visible force for change. In a long scope, computers have radically changed daily routines of many employees and organizations. In the 21st century the capability for mobile life has and will make a big difference how and where people live and spend their time. Recent subprime crisis and crisis of Euro have brought out the importance of economic shocks as s force for change. However, such driving forces have also been present before: in the early 2000's the burst of the dot-com bubble shocked stocks and ICT industry all over the world and approximately ten years earlier the fall of the Soviet Union distressed economies of many countries for multiple years. (Robbins 2003.)

As mentioned earlier, one of the major forces for organizational change is competition. Competition has tightened locally but it also has become more global. The significance of domestic sales has decreased as more sales of western companies come outside the homeland's borders. The field of competition has changed a lot in many industries due to multiple mergers and consolidations. For example, leading Business Intelligence solution providers, such as Business Objects and Cognos were acquired by SAP and IBM respectively (Kelly 2009). This is only one example how companies are expanding their offerings and this way trying to offer their customers more integrated and extensive solutions. Also the e-commerce has changed competition in the terms of cost efficiency and new distribution channel. (Robbins 2003.)

Changes in social trends drive especially B2C companies for change. Internet has become part of most people's everyday life in both developed and developing countries. Newest trends such as social media and networks have drawn also B2B companies' attention for example in recruiting. Changes in demographic variables may be even stronger force for change. In many western countries the retirement of baby boomers will have major effect on the social structures of these countries. Increased interest in urban living especially in developing countries is a driving force for organizational change in many local and also global companies (Economist 2010). The last force in Robbins' (2003, p. 556) classification is the change in world politics. Recently, many rapidly developing countries, such as China, have opened their markets for foreign companies. This has been a major driving force for companies to move their production closer to expanding markets. Also treaties like NAFTA and EU have advanced the globalization. (Robbins 2003.)

2.1.2. Change process

The change process has been under many examinations during the last six decades. One of the most foundation-laying theories was created in the middle of the 20th century by psychologist Kurt Lewin. His three-step framework of force field analysis is description of people's tendency to resist change and the forces that are driving the change. The model links also Lewin's earlier research of group dynamics to change process and how the dynamics is affecting on individual's perception of change. The description of framework's change process is regarded as oversimplifying, which may be one of the reasons why the framework has been generally used and recognized. It divides the change process into three stages: unfreezing, changing and refreezing (Figure 2.2). Although the framework was not originally developed considering only organizational change issues, it has become a useful tool for managers to understand the different stages of change and how they should be dealt in order to in increase the likelihood of a successful change. Despite the simplicity, one should not forget that the framework is not just a simple change model with three separate stages but it was developed on the basis of Lewin's earlier research which takes also group, organizational and societal levels into account. (Pinnington & Edwards 2000; Yukl 2001; Burnes 2004.)

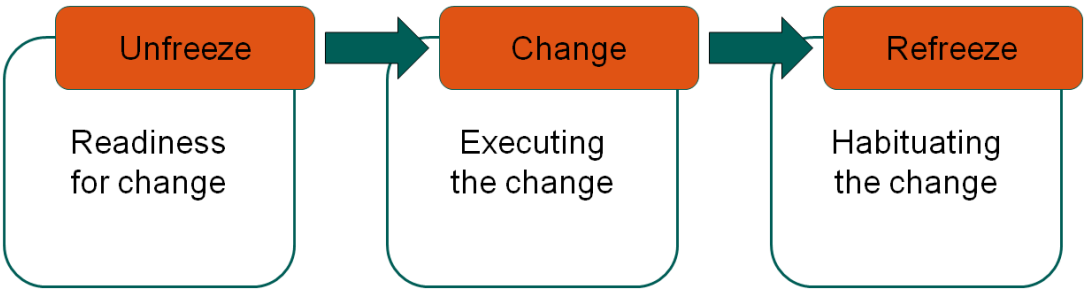

Figure 2.2: Lewin's three-stage change process (Pinnington & Edwards 2000).

The first stage, unfreezing, is the phase where the readiness for change is created. From the individual perspective this means that the need for particular change has to be recognized. 'Unfreezing' of an individual can happen unconsciously and independently or like in many deliberate changes it can be promoted by the change agents. The initiative for the recognition may also be the result of some earlier event or crisis. The phase of unfreezing is critical in the sense of change management: without a proper unfreezing the change is likely to meet very strong resistance and conversely, a good unfreezing may ease the change management in further phases. (Pinnington & Edwards 2000; Yukl 2001.)

In the second stage of Lewin's the change itself must be executed. Unlike in many changes, one should not only focus on individual factors. Many other things, such as structural and political factors, must be regarded. From the individual perspective the resisting forces of change must be overcome somehow. They can be reduced or the change can be promoted by strengthening the driving forces. (Pinnington & Edwards 2000.) This juxtaposition of resisting and driving forces is discussed more deeply in later subchapters.

The last step of the change process is refreezing. The change executed in second step must be habituated. If the change cannot be embedded, the results can be seen only for a while and the change may be reversed quickly. Many change processes have failed after all because new habits or processes have not been able to implement into daily processes. (Pinnington & Edwards 2000.) For example, the number of BI users may be doubled but the actual usage and utilization of BI solutions in everyday processes is still on the same level than before the change.

Although Kurt Lewin's change management theory is considered to be the ultimate foundation for the further researches, his theory has been under heavy criticism. It has been said to be inadequate to respond the rapid pace of change in today's environment which companies confront. As the pace of change has speeded up, companies are left less time for the refreezing stage of Lewin's model. A lot of conceptual models of organizational change appeared in the last decades of 20th century in addition to Lewin's model. (Frantz 2004.) For example, Weick and Quinn (1999) presented a model for continuous change, which emphasize companies' need for constant adaption.

They replaced “change” phase in Lewin’s model with “rebalance” trying to align the model better with today’s rapidly changing environment. (Weick & Quinn 1999.) Lewin’s model has been also criticized being too simplified. Different, more detailed phase-models have been developed since of which Kotter’s (1995) eight-step model is introduced later in this thesis to get more detailed view of change and its management (Armenakis & Bedeian 1999). However, despite all the criticism and becoming unfashionable, Lewin’s model has been proved to be relevant and practical if it is not interpreted too concisely (Burnes 2004).

2.1.3. Magnitude of the change

It is important to be able to recognize different kinds of changes and their characteristics. One of the most important dimensions to be considered is the scope of the change. This variable affects on many aspects of change such as arising change resistance and how resistance should be dealt with. The scope of the change can be described in a continuum starting from low-scope changes ending to high-scope ones (Figure 2.3). The true division is not that black-and-white but most of the changes fall somewhere between these two extreme ends. (Pardo del Val & Martinez Fuentes 2003.)

Figure 2.3: The scope of the organizational change (Pardo del Val & Martinez Fuentes 2003).

Low-scope, also known as first order changes can be seen as evolutionary changes. They are small incremental changes that aim for certain improvement and they are happening all the time from deliberate initiatives or incautiously. Within these kinds of changes the general framework of doing things is kept the same so the perceived interruption is not that radical. For example, in accounting one may divide a certain account into two accounts in order to get more detailed information. This kind of change does not change daily processes radically which is why perceived benefits may also be quite small. (Nadler & Tushman 1989; Goodstein & Burke 1991; Pardo del Val & Martinez Fuentes 2003.)

High-scope, also known as second order changes are opposite to low-scope changes in many ways. These are usually strategic changes that occur only from deliberate initiatives. During the most revolutionary changes organization changes its essential framework of doing things. By restructuring the way of working one can generate a totally new base for organization’s competition and affect on the capabilities of entire organization. For example, a manufacturing company might move from traditional make-to-stock (MTS) manufacturing to make-to-order (MTO) manufacturing. This kind

of transition may require huge changes in various daily processes and in way of doing things through the whole organization. (Nadler & Tushman 1989; Pardo del Val & Martinez Fuentes 2003.)

How one can say whether a change is low-scope or high-scope? Weick and Quinn (1990) suggest that the contrast between these two levels of change reflects differences in the perspective of the observer. If one takes distance and looks things from the macro level, daily repetitive actions and routines can be seen as occasional episodes of a revolutionary change. However, these same daily actions can be seen as ongoing adaption and adjustment from the closer, micro level look. The perspective of the observer should be considered carefully because people do perceive changes differently. For one the change may not be a big deal while for another it may feel like revolutionary and cause significant reactions. (Weick & Quinn 1999.)

The presented scope of the change is a linear point of view with two ends. It covers both 'broadness' and 'depth' of the change by summarizing them together. However, de Wit and Meyer (2005) divide this view of the scope into two different dimensions: scope of the change and the amplitude of the change. According to these two dimensions, one can create a fourfold table which classifies four different magnitudes of change. This is presented in Figure 2.4.

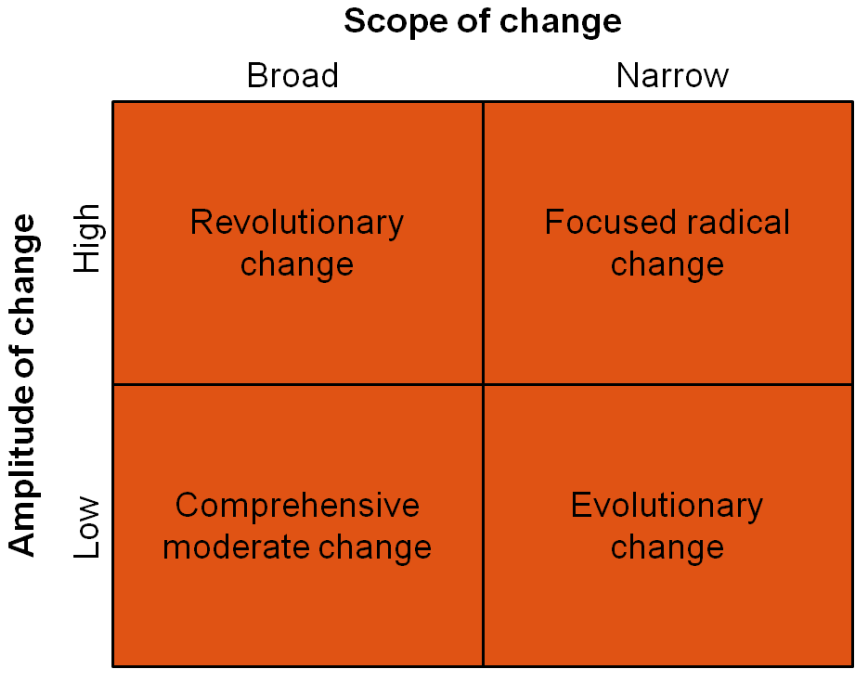

Figure 2.4: The magnitude of the change (de Wit & Meyer 2005).

A revolutionary change is close to a high-scope change presented by Pardo del Val and Martinez Fuentes (2003). However, especially in large companies one might have to consider the broadness of the change in more detail. The example of transition to MTO manufacturing might consider only one division or even one factory of a larger

corporate. This kind of "focused radical change" in de Wit's and Meyer's (2005) taxonomy may require significantly different resources and may have totally different coordination than broad, "revolutionary change". Controversially, adding a more detailed chart of accounts has different outcomes whether it is done locally (evolutionary change) or globally (comprehensive moderate change). The linear view of Pardo del Val and Martinez Fuentes (2003) is adequate for most, but it still cannot make this important difference between company-wide and more focused change whether the amplitude of change is low or high.

2.1.4. Pace of the change

Besides the magnitude of the change, the pace of the change is one of the most important dimensions which should be taken into account especially when resistance to change is considered. Sometimes the pace of the change is used to define a revolutionary and an evolutionary change in addition to the scale dimension. The Evolutionary changes are then claimed to develop slowly and gradually and revolutionary swiftly and widely. (Greenwood & Hinings 1996.) However, in this thesis evolutionary and revolutionary are defined only by the magnitude of the change leaving the pace of change as a separate dimension. As mentioned already in this thesis, organizations meet today more rapidly changing environment than ever before which sets them pressure to change themselves even more rapidly. However, how the pace of the change affects the transformation process after all and whether the change should be fast of slow have not been researched a lot and therefore the effects are certainly not conclusive. (Amis et al. 2004.)

The pace of the change is usually examined with the magnitude of the change. Some authors (e.g. Tushman et al. 1986) claims that big, revolutionary changes should be implemented rapidly to obtain synergy by pulling all parts of the organization in the same direction. They also defend a rapid pace by emphasizing uncertainty and instability which may arise as the change process gets longer. Slowly developing change may create growing 'pockets of resistance' which are even harder to overcome. However, sometimes changes just must be fast e.g. in order to response to changed legislation. (Tushman et al. 1986.) The advocates of slower change conversely stress that the adaption to change should happen gradually or incrementally on a small scale in order to build momentum for further adoptions and to demonstrate the benefits of change (e.g. Kotter 1995). In a radical change slow speed is also less disruptive and more manageable. Establishing trust among the stakeholders of the change is crucial. However, in some occasions this may take a lot of time, which supports the lower pace of the change. (Amis et al. 2004.)

The on-going debate between the advocates of fast and slow pace might indicate that the optimal pace of the change is dependent on multiple variants and therefore the optimal pace depends on particular case and its environment. Sometimes it might be necessary

to advance or postpone the change. For example, if there are two overlapping projects they might have to adjust the pace of the change according to the other. As said, the pace is not the only thing to be considered. Many other things, such as sequence of the actions have significant impact on success of the change process. As well, Amis et al. (2004) found that no matter the pace of the change, high-impact elements in the beginning of the change process send a clear message of change being implemented to different stakeholders. The pace, the sequence and the magnitude of the actions within a change process should not be handled separately.

2.2. Organization change resistance

2.2.1. Resistance to change

Successful changes in organizations are rarer than failures. This appears in many researches. For example, according to Maurer (1996) over half of the major change efforts in companies tend to fail. The change does not have to be even major to fail: a survey of 1536 executives indicates that over 60 % of total change initiatives were not successful (Isern & Pung 2007). There are multiple reasons for these failures but many researches show that the ultimate reason can be found in resistance to change (e.g. Lawrence 1954; Strebel 1994; Maurer 1996; Waddell & Sohal 1998). To get the most out of the change process, one must understand the change resistance, which is one of the most important topics in change management (Pardo del Val & Martinez Fuentes 2003). Although the change process would not be a total failure or even the change would be considered to be successful, resistance to change hinders people's adoption and the progress of change (Robbins 2003). Waddell and Sohal (1998) say that managers' theoretical understanding of resistance to change is good. However, this understanding has not impacted on the common perceptions of management which is why change resistance has stayed one of the major reasons of change failure. Maurer (1996) has even less positive view: he claims that resistance is little recognized in companies overall even though it is important contributor to the failure.

Resistance to change is a term used in everyday life and people seem to have a shared understanding of its meaning. However, in literature many authors have presented the concept of change resistance without giving an exact definition for it. Resistance of change is just presented as a list of different causes affecting on it and how these causes may be overcome. This supports a view that people do not resist change *per se*, but they rather resist the uncertainties and the possible outcomes, such as loss of status or loss of pay, caused by the change. (Waddell & Sohal 1998; Dent & Goldberg 1999.) The significance of individual resistance is obvious, but for example Kotter (1995) says that pure individual resistance is rare. The source of resistance may lie in the organizational structure or in the practices, such as in the appraisal system. However, in the end the resistance is concretized in the actions of individuals no matter what is the ultimate source. In this thesis, like in most literature, no exact definition of resistance to change

is given. Whether the resistance to change is more individual and mental model or a system's concept as Kurt Lewin introduced it, it does not change the fact that it should be overcome to enable the change and engagement of individuals. (Dent & Goldberg 1999.)

Resistance to change can appear in many ways: it can be overt, implicit, immediate or deferred. However, resistance does not appear in standardized ways. It varies case by case depending on many aspects such as individual, for example personality, or change aspects, for example the pace or the scope of particular change. Resistance to change is easiest to handle with when it is overt and immediate. People express their feelings openly and right on time which makes it easier for managers to deal with it. However, implicit resistance is more subtle. Loss of loyalty, loss of motivation or absenteeism due to sickness are just some signs to be mentioned which are relatively hard to notice quickly. They may inhibit the change process and in a worst case these reactions can build up and explode with dramatic outcomes. (Robbins 2003.)

As said, resistance is one of the most significant reasons why changes fail. This is why it is understood as undesired phenomenon which is harmful to organizational health. In most of the times, resistance to change causes increased costs and delays the intended change. Every individual perceives change in their own way, which is only one of the reasons that make the resistance of change very complex issue. Although the negative effects of resistance have been recognized, resistance has also its ignored upside: people learn from it. Every individual may learn something new from themselves, but above all, resistance to change is a useful source of information from both the organization and individuals to managers (Lawrence 1954; Piderit 2000). Resistance to change may result in healthy debates and better decisions. It also gives managers a chance to learn how to deal with the resistance to change in the future. One can also claim that resistance to change provides a certain level of stability and predictability to behavior in organizations. Otherwise organizational behavior would be chaotic and random. (Waddell & Sohal 1998; Pardo del Val & Martinez Fuentes 2003; Robbins 2003.)

2.2.2. Obstacles of engagement and change

Strebel (1994) has developed a model which is based on the juxtaposition of change and resistance forces originally presented by Lewin in the middle of the 20th century. Both the change and the resistance forces have many forms but the key is which ones of these are dominant. If the resisting forces are strong and the change forces are weak at the same time, status quo agents[1] are likely to dominate and no change occurs. This can be seen in the top left-hand corner of Figure 2.5. In general, these kinds of situations may be present in regulated markets and bureaucratic governmental organizations where

[1] Status quo agent = A person who is willing to keep status quo, acts as inhibitor (Robbins 2003).

change forces are typically weak. A reversed case, where the change forces are strong and the resistance is weak, results in continuous change. In these kinds of environments change agents[2] dominate the small number of status quo agents and people are generally used to change. According to Strebel (1994), this description fits well into new companies or independent business units of bigger companies. (Strebel 1994.) However, if the business units are not totally independent and change initiative is put outside the particular organization, the change resistance may be even stronger.

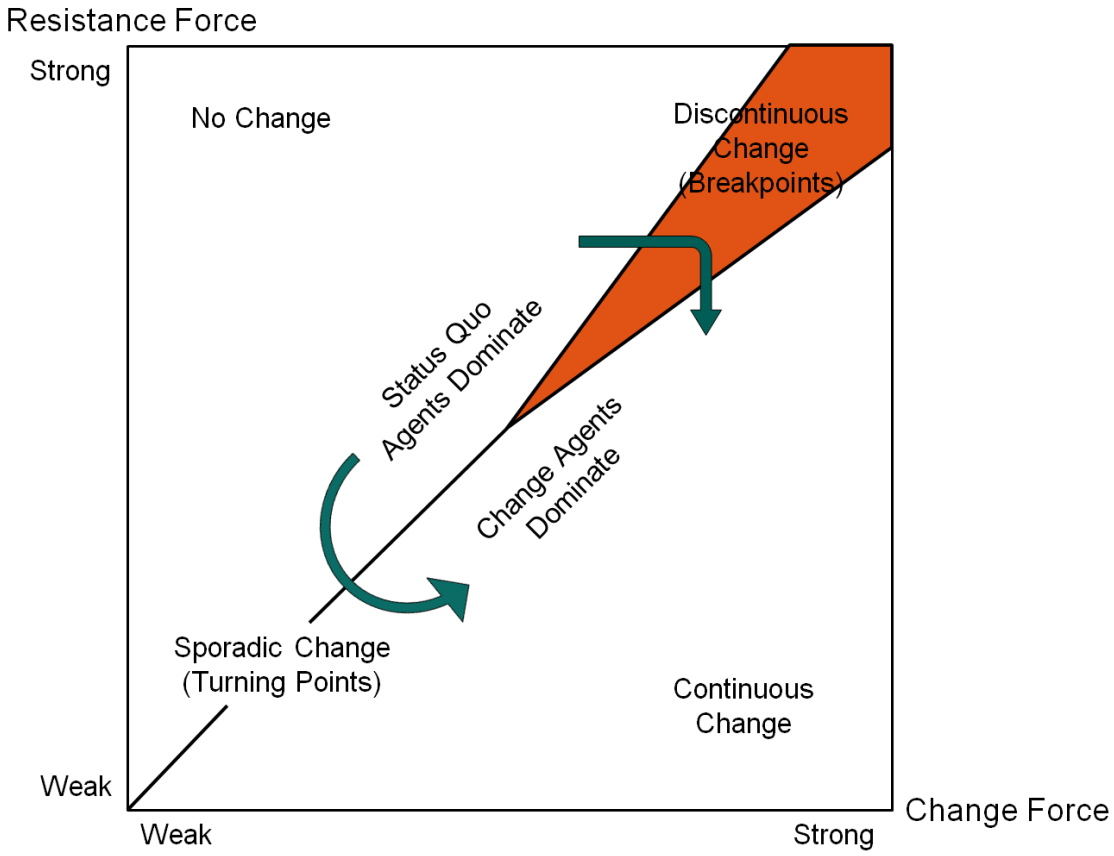

Figure 2.5: Change Arena model according to Strebel (1994).

In the bottom left-hand corner both the resistance and the change forces are weak but relatively equal. The boundary between no change and continuous change can be easily crossed. Small change events can alter the balance between resisting and driving forces. At these turning points the status quo agents change their side and turn to be change agents. This is called sporadic change. Controversially, in the top right-hand corner both the resistance and the change forces are strong. If change occurs in this kind of situation, it will be massive and sudden shift where the status quo agents are defeated by

[2] Change agent = A person who is responsible for managing change activities, acts as catalyst (Robbins 2003).

the change agents. This kind of discontinuous change needs a breaking point. (Strebel 1994.)

To make a change happen, driving forces must exceed resisting forces. Usually the problem is not the lack of driving forces, but conversely the emerging resisting forces. It is often noted that adding a driving force produces an immediate resisting counterforce which tries to maintain the equilibrium. Because of this the change is more likely to occur when one removes resisting forces away from the way of already existing driving forces. (Schein 1996.)

2.2.3. Sources of resistance

Resistance to change is natural to human beings. Organizations which consist of human beings are very conservative by their nature and they actively resist change. (Schein 1985; Robbins 2003.) As mentioned in the previous chapter, people do not resist change *per se*, they rather resist the uncertainties and other possible outcomes caused by change (Waddell & Sohal 1998; Dent & Goldberg 1999). The sources or the causes of resistance to change have been under many researches during decades. Although classification or grouping of the sources varies in the literature, today authors agree quite well on the sources of resistance. Dent and Goldberg (1999, p. 28) have made a review of five different textbooks from the beginning of the 1990s. Although they are almost 20 year-old, a lot has not changed so far. These causes or sources of resistance to change are presented in Table 2.1.

Table 2.1: The causes of resistance to change according to textbook review by Dent and Goldberg (1999, p. 28).

Authors	*Kreitner (1992)*	*Griffin (1993)*	*Aldag & Stearns (1991)*	*Schermerhorn (1989)*	*Dubrin & Ireland (1993)*
Sources of resistance					
Surprise	x				
Inertia	x				
Misunderstanding	x	x	x	x	
Emotional side effects	x	x	x	x	
Lack of trust	x	x	x	x	
Fear of failure	x				x
Personality conflicts	x	x	x	x	
Poor training	x				
Threat to job status/security	x	x	x	x	x
Work group breakup	x	x	x	x	
Fear of poor outcome					x
Faults of change					x
Uncertainty		x	x	x	

Dent and Goldberg's (1999) list is undeniably comprehensive but it has the same problem than many of other lists. Some sources such as work group breakup and poor training are very concrete and therefore they are on different level than for example uncertainty and emotional side effects. Uncertainty may result for example from poor training. However, this overlapping and cross-dependency is hard to be avoided if one wants to create a comprehensive list.

The review by Dent and Golberg (1999) is useful for managers just like that. However, it does not pay attention whether the source of resistance is likely to be more individual or more organizational. This division may help managers to find a right approach and action to overcome the resistance to change. By overcoming organizational resistance one can advance change more extensively, and conversely, some sources of resistance may be very individual and they have to be dealt in different way. Robbins (2003) classification of the sources of resistance is presented in Figure 2.6.

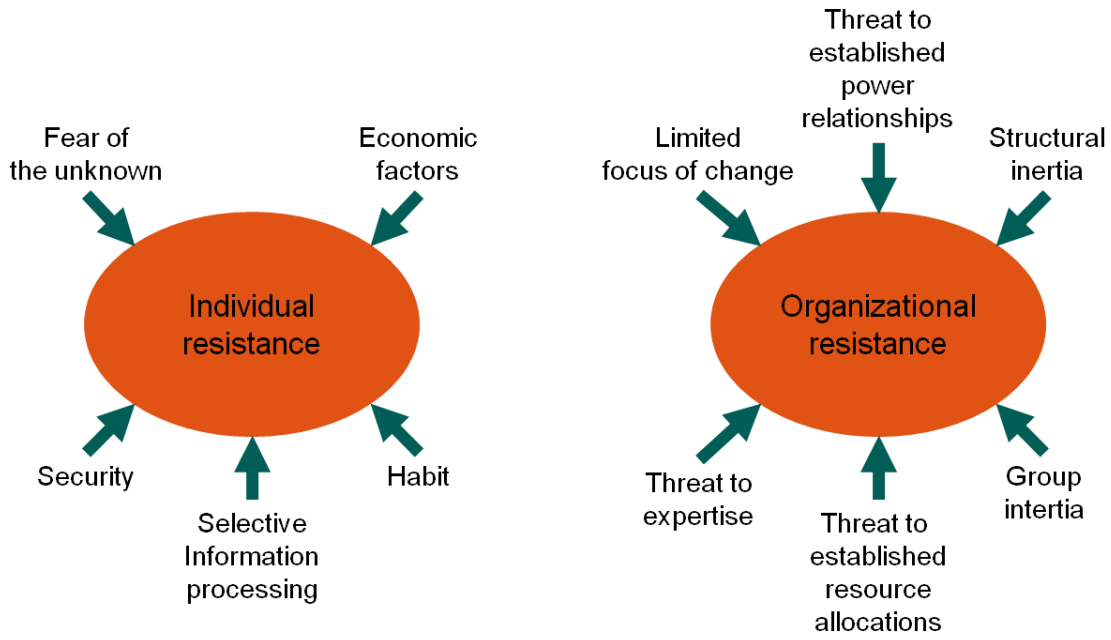

Figure 2.6: Individual and organizational sources of resistance according to Robbins (2003, pp. 559-561).

A closer look to Figure 2.6 reveals that the individual and the organizational sources of resistance overlap in many terms. For example, threat to expertise reflects security aspect at individual level. Also many sources of organizational resistance, such as threat to established power relationships or resource allocations, are connected to individual fear of the unknown. Although Robbins' (2003) categorization of the sources of resistance include same sources than the classification of Dent and Goldberg (1999), both of them are useful for analytic purposes when resistance to change is dealt.

In addition to the division between individual and organizational sources, one should consider other groupings and categories of the sources of resistance. Pardo del Val and

Martinez Fuentes (2003) have made also a comprehensive literature review of the change resistance. Besides, they have grouped the sources of resistance or inertia according to the stage they exist in organizational change. This kind of division helps managers to focus their actions correctly in the timeline of particular change. This also helps to position the sources of resistance to different stages of Lewin's three-stage model although the model should not be considered to be linear. The resistance in formulation stage can be categorized into three groups: 1) distorted perception, interpretation barriers and vague strategic priorities, 2) low motivation, and 3) lack of a creative response. These categories and the sources of resistance in formulation stage can be seen in Table 2.2.

Table 2.2: The sources of resistance in the formulation stage (Pardo del Val & Martinez Fuentes 2003, p. 150).

Distorted perception, interpretation barriers and vague strategic priorities	Myopia Denial Perpetuation of ideas Implicit assumptions Communication barriers Organizational silence
Low motivation	Direct costs of change Connibalization costs Cross subsidy comforts Past failures Different interests among employees and management
Lack of a creative response	Fast and complex environmental changes Resignation Inadequate strategic vision

Many of the sources of resistance may exist also in change's implementation stage. In addition to the sources in formulation stage, Pardo del Val and Martinez Fuentes (2003) have categorized the sources in implementation stage into two groups: political and cultural deadlocks and other sources. These sources can be seen in Table 2.3.

Table 2.3: The sources of resistance in the implementation stage (Pardo del Val & Martinez Fuentes, p. 150).

Political and cultural deadlocks	Implementation climate and relation between change values and organizational values Departmental politics Incommensurable beliefs Deep rooted values Forgetfulness of the social dimension of changes
Other sources	Leadership inaction Embedded routines Collective action problems Capabilities gap Cynicism

If one can recognize and predict in which stage of the change process resistance occurs and whether the source is more individual or organizational, overcoming the resistance to change is much easier. For example, a manager can put efforts to overcome an early-stage source of resistance if it is likely to be cumulated. Also grouping and categorizing different sources may help managers to find right tools and media to handle and overcome the resistance.

2.2.4. More detailed framework for managing change

Waddell and Sohal (1998) put that when resistance to change is minimal, the change itself is managed well. However, some resistance exists always and it cannot be totally diluted and overcome even by good managers, but with good management of change one can significantly improve the outcomes. In chapter 2.1.2 Lewin's three-stage model was introduced but for some managers and authors it is a bit too general and simplifying when overcoming resistance of change is considered. One of the most recognized change management models was developed by Philip Kotter. His eight-step model is built from the management perspective and it is therefore very practical and useful tool for managing change and also resistance to change. Although the model considers more major changes, it is useful also for smaller ones. (Kotter 1995.)

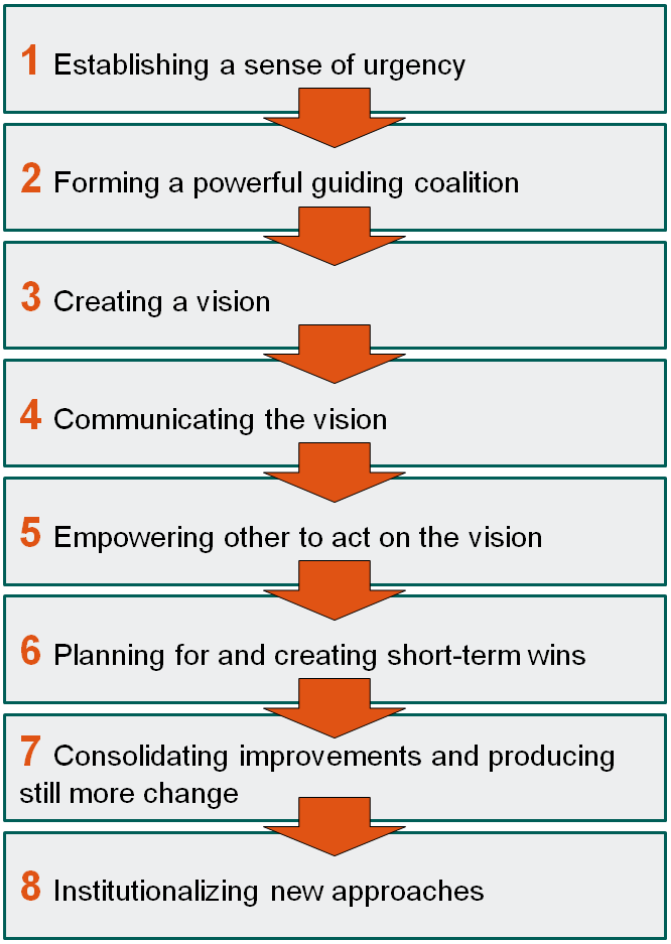

Figure 2.7: Eight-step change management theory by Kotter (1995).

The first step of Kotter's model is to establish a sense of urgency. This stage is similar compared to Lewin's unfreezing step. Some people are more used to change than others and some people are just more risk-averse willing to keep the status quo. In many occasions people are just not aware of the crises or the opportunities which is why a good communication is essential for triggering the sense of urgency. There is a dilemma related to the urgency for change: in bad times, when company is losing money, there is a need for change, however, there might not be enough resources to implement it. Conversely, in good times there are adequate resources for change but the people might be comfortable with status quo and therefore there is no urgency of change. (Kotter 1995; Pinnington & Edwards 2000.) Next step is to form a powerful guiding coalition. The change should be guided by a group with enough power to lead the change efforts. Depending on the case, the guiding group should consist of different kinds of individuals who have different titles, information and expertise, reputation and especially relationships. The variety of people brings different points of view to discussion and it also signals the organization about the wide-range commitment to change. The people of the guiding coalition should personally be committed to the change. It would be absurd that a part of guiding group itself would resist the change. (Kotter 1995.)

Third and fourth steps are related to creating a vision and communicating it. A clear vision of change helps to direct the change efforts and in major changes it helps to create strategies for achieving the vision. Without a proper vision the change can dissolve into a distinct confusing and incompatible efforts and projects. The vision should also be easily communicated and appealing because people are not tend to engage if they do not know exactly what is the goal of the change. Even if people are unhappy, they are not ready to make sacrifices if they do not believe that a useful change is possible to be executed. If the change of urgency is established well, absorption of vision communication will be better. In any case, it is important to reach as many people as possible by using different communication channels. (Kotter 1995.)

In most cases, the change cannot be successful without the contribution of other people. Fifth step of Kotter's model is empowering other to act on the vision. In the concrete level this means getting rid of the obstacles that are resisting change. Obstacles may exist in different forms: it may be organizational structure that is inhibiting the change or it may be for example the rewarding system that does not encourage people to drive the change. The blocker can also be a person or a group of persons who is resisting the change because of individual reasons. These people should be treated fairly to prevent the possible spread of resistance. (Kotter 1995.) One of the most disregarded things in major and long-term changes is to plan and create short-term wins. Performance improvements should be made visible early because people tend to give up easily and join the ranks of resisting forces. Making improvements visible means a communication and also rewarding employees of performance improvements. Short-term wins are also

an evidence of doing right things to the guiding or steering group. (Schaffer & Thomson 1992; Kotter 1995.)

The last two steps of Kotter's model are equivalent to the last stage of Lewin's model, refreezing. Achieved improvements should be consolidated and producing change should not be stopped. New employees, projects, themes and change agents should be introduced instead of retiring on one's laurels. There is always a risk that the initiators of change go overboard and join the resistors. This can quickly stop the change if early victory celebration is done for nothing. The last of eight steps is to institutionalize new approaches. This means articulating employees the connection between the new behaviors introduced by change and the success of the company. Still, one should ensure that the development and the succession of change keep going. The ultimate goal is to root the change until it is "the way we do things around here". (Kotter 1995.)

2.2.5. Engaging individuals

The models of general change management, such as Kotter's (1995), are very useful frameworks for managers. They enhance better overall change management which correlates with lower change resistance and better engagement. However, sometimes managers need to take more individual view for change resistance and overcoming it. As presented in chapter 2.2.3, the sources of resistance to change can be divided into individual and organizational. Although these sources may overlap, there may be totally personal things related to organizational change that are not shared by any other. For example, during changes people are treated and encountered differently which may create totally different kinds of reactions. (Folger & Skarlicki 1999.)

There have been a lot of practical studies outside the general change management frameworks how to overcome the resistance of change. One of the most critical success factors in these researches has been a good communication (e.g. Waddell & Sohal 1998). The importance of communication the vision of the change and the daily change communication has been emphasized also in Kotter's (1995) model. However, communication is understood too often as a one-way channel. Employees should be provided an opportunity to give feedback personally whenever they feel so. Responding to the feedback in any way is crucial because employees should not feel that their feedback is falling on deaf ears. Among the communication, the participation of employees is another critical success factors regarding the resistance of change and the engagement of employees. When employees are participated in the change process, they feel more committed as they have a chance to affect on the outcomes of the change. People may be participated for example by consulting them in questions that are related to their expertise or by participating them in planning and designing the change that accounts them. (Waddell & Sohal 1998.)

In their textbook review, Dent and Goldberg (1999, p. 28) have listed different strategies and ways to overcome the resistance of change (Table 2.4). Notable in this review was that all of the means were not 'soft'. Diluting the resistance may need forcing in some instances. For example, if a company has decided to change one of their software to another, they may stop the maintenance and the support of the old one or even reject the access to it. Usually, when people have no choice, the resistance is diluted but general dissatisfaction may increase. (Dent & Goldberg 1999.)

Table 2.4: The strategies to overcome the resistance to change according to textbook review by Dent and Goldberg (1999, p. 28).

Authors	*Kreitner (1992)*	*Griffin (1993)*	*Aldag & Stearns (1991)*	*Schermerhorn (1989)*	*Dubrin & Ireland (1993)*
Strategies for overcoming					
Education	x	x	x	x	
Participation	x	x	x	x	x
Facilitation	x	x	x	x	
Negotiation	x	x	x	x	x
Manipulation	x	x	x	x	x
Coercion	x	x	x	x	
Discussion					x
Financial benefits					x
Political support					x

The variety of different means and methods of engagement is rich but managers need to find the right ways to encounter the particular resistance of change. The used means should meet the individual aspects as well the constraints of organization. The participation may turn to have even negative outcomes if employees do not have enough time for taking part. This may increase the dissatisfaction towards the management of change and also people's contribution may even slow down the progress of change if they have to make decisions in rush. (Waddell & Sohal 1998.)

In the best occasion when change is managed well, resistance to change may even turn to be a good thing. Consulting and participating employees, a good communication and taking feedback may increase the overall commitment and the engagement to the change and also to further changes. Turning a head of a status quo agent may be an initial to a bigger wave of turnovers and this may create a breaking point of change (Strebel 1994). This is one example why Lewin's model should not be treated as a simple model of categorizing the actions of change process but the actions and the resistance should be considered in their broader context that takes their mutual dynamics into account.

2.3. Dilemmas of change management research

The change and its management in organizations are very complex issues in the field of research. Pettigrew et al. (2001) have listed different challenges of studying organizational change and development which have been present in already conducted research and will been present in the future as well. Multiple context and levels of organizational change, unique history and international comparability are just few challenges to be mentioned that researchers face. The study of organizational change and development is also very close to social sciences which sets even more challenges for the conduction of the researches. (Pettigrew et al. 2001.)

Many different themes or issues have been discussed in change management literature both separately and together. Armenakis & Bedeian (1999) have categorized these issues into four groups: substance of contemporary organizational changes, contextual issues such as conditions and forces of environment, change processes and criterion of organizational change. In additions to these, the social science research has covered also monitoring the affective and the behavioral reactions to change. This wide range of different topics and issues has resulted in huge number of different more or less complex theories trying to response the contemporary organizational demands and trying to cover as many of these issues as possible. However, many theories and frameworks have been criticized of having too little empirical evidence and being only bits of advice. (Armenakis & Bedeian 1999; Pettigrew et al. 2001.)

On this thesis a couple of process models of change management have been presented starting from the fundamental model of Kurt Lewin. Although Lewin's model has been under major criticism since 1980s, for example being too simplifying, assuming that organization work in stable environment and being management-driven top-down model, its significance cannot be denied. (Burnes 2004.) Many other process models, for example Kotter's (1995), are derived from Lewin's original being more detailed and trying to be suitable for today's world. Despite the limitations of Lewin's model, it has been proven to be still relevant. For example, Fiol (2002) has used Lewin's three-stage model successfully as a basis of her widely referred research. Burnes (2004) also concludes in his examination of the Lewin's model it is still relevant to the modern world considering change process and its management.

3. BUSINESS INTELLIGENCE AND BUSINESS INTELLIGENCE COMPETENCY CENTER

3.1. Business Intelligence

3.1.1. Definition

Business Intelligence (BI) is a term which is used very widely and in various meanings. Howard Dressner, today a well-known authority and the lecturer of particular topic, was the first one to use term BI in 1989. He defined Business Intelligence as "an umbrella term to describe different concepts and methods to improve business decision-making by using fact-based support". (Burstein & Holsapple 2008, p. 176; Gartner 2010.) The initial definition is quite broad why it is able to cover many other later definitions under it.

Burstein and Holsapple (2008) define Business Intelligence in more detail as "systems that combine data gathering, data storage, knowledge management with analysis for presentation to planners and decisions makers with objective to improve timeliness and quality of the input decision-making". In a nutshell, analogy for Business Intelligence can be found from the logistics: getting information to the right location in the right time in the right form. (Bustein & Holsapple 2008, p. 176; Stevenson 2009.) Miller et al. (2006) count also on the 'triple rights of information' definition and emphasize that goal of the Business Intelligence is to enhance more effective decision-making. Ranjan (2008, p. 461) as well emphasizes the decision support function of BI and brings out an important aspect in his definition, which is that BI is business-driven. In Figure 3.1 the role of Business Intelligence in decision-making is demonstrated.

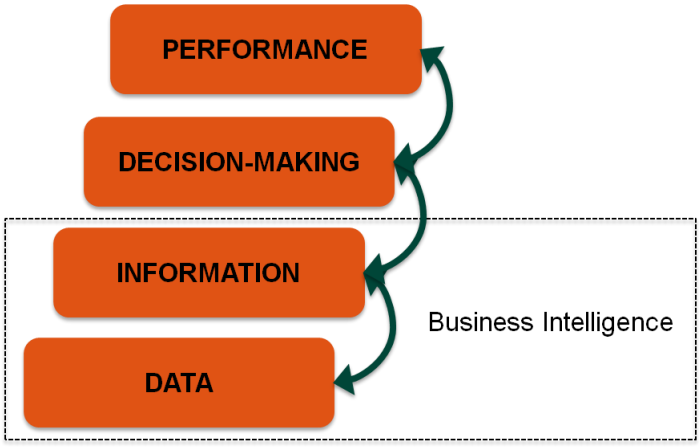

Figure 3.1: Business Intelligence's supporting role in decision-making (Rytkölä 2010).

Although different definitions of BI share many similar points and aspects, there is clear disagreement whether external information is included to Business Intelligence. Burstein and Holsapple (2008) state that traditionally BI has focused more on companies' internal information but in many occasions it is combined with the external environment to expand the scope and therefore to support decision-making more efficiently. However, usually this information gathering, analyzing and managing of external environment is considered to be a distinct subject called Competitive Intelligence (CI) (Burstein & Holsapple 2008). Ranjan (2008, p. 461) does not either draw a line between the internal and external environment defining the BI input "from any and all data sources".

In any case, the importance and the business justification of Business Intelligence is undeniable. As mentioned in the introduction, the quality and the timeliness of the decision-making input is crucial in competitive and increasingly uncertain world. Miller et al. (2006, p. 4) say that transforming raw data to actionable intelligence offers innumerable competitive advantages. According to Ranjan (2008, p. 461), BI is the question of survival and bankruptcy and therefore it does not guarantee a competitive advantage any more. Because Business Intelligence is very broad topic, there are almost as many definitions as there is people and perspectives. No matter whether the definition of Business Intelligence covers the information about external environment or whether Business Intelligence is a source of competitive advantage, authors agree that the goal of BI is to enhance better decision-making. Because Business Intelligence is fueled by the utilization of the information it provides, the initiative should therefore lie in business who is making the crucial decisions in the end.

3.1.2. BI components

Although the scope of this thesis is not to focus on technical side of Business Intelligence, it is necessary to explain the basics of different processes to create a sound understanding of the environment. The definition of Business Intelligence is close to the definition of decision support systems (DSSs) but the difference is that BI is data-driven and it emphasizes the analysis of large volumes of data. (Burstein & Holsapple 2008.) The data used by Business Intelligence is originated from different data sources: operational systems such as Enterprise resource planning (ERP) or Customer relationship management (CRM), historical and possibly some external data sources (Ranjan 2008).

One of the most significant keys to a successful BI system is the integration of data from multiple sources. In this thesis the focus is on the data consolidation leaving for example the data federation and data propagation outside the scope. In data consolidation the target data is pulled from different sources into a single enterprise data warehouse (EDW) or data warehouse (DW). In this thesis the latter term is used to cover data warehousing. The process is presented in Figure 3.2. The data in original

sources is in most cases very shattered, heterogeneously formatted and governed more or less well. This is why the data needs to be reformatted, transformed and cleaned before the consolidation. Extract, transformation, and load (ETL) is generally used technology in this purpose to pull the data from the sources and to push it to the data warehouse in decent and uniform format. In data warehouse the data is arranged to different data marts which are collections of subject areas such as finance or marketing. The idea behind this is to organize a huge data warehouse to better decision-support. (Inmon 1999; White 2006; Ranjan 2008.)

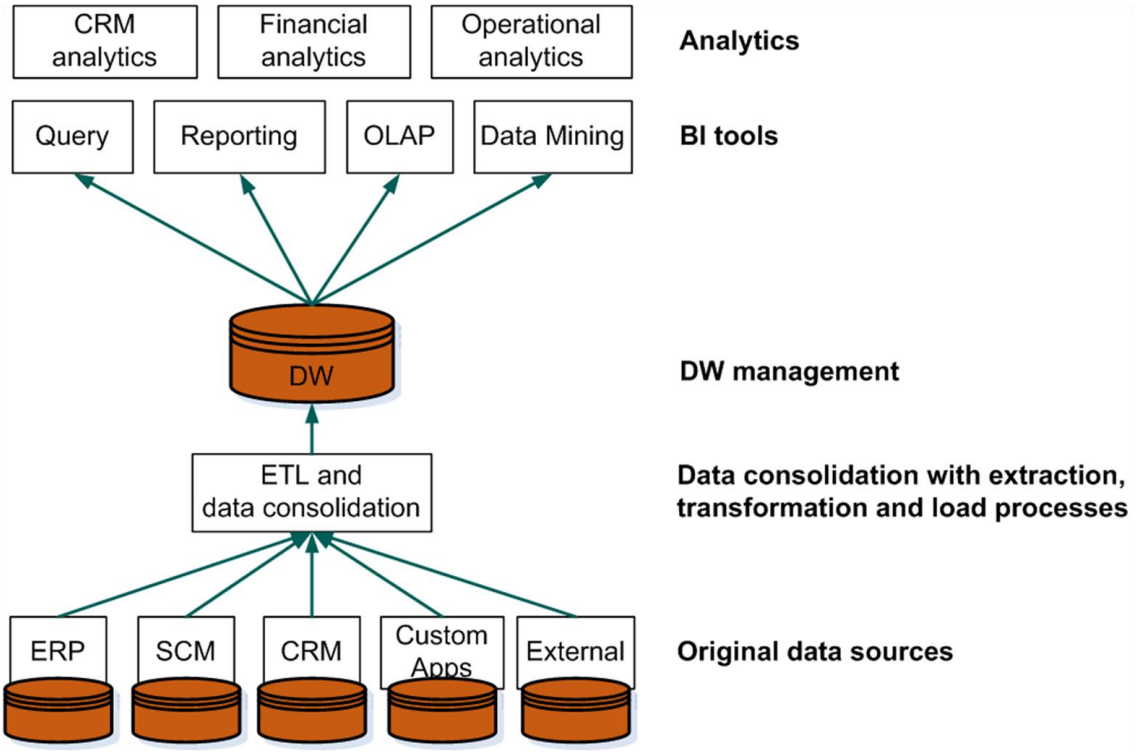

Figure 3.2: A typical BI environment modified from Ranjan (2008, p. 466).

After the consolidated data is loaded to DW it is ready to be analyzed by different tools. The variety of tools and methods is huge and it is most important to select a right one for right purpose and user. Different terms of analytic techniques, methods, tools and applications are mixed in the literature but they all serve the same purpose: to enable better decisions. Basic statistics, data and text mining, forecasting, visualization, querying, reporting and multidimensional analysis with online analytical processing (OLAP) are some to be mentioned. (Burstein & Holsapple 2008; Ranjan 2008.) According to Ranjan (2008, p. 461) one of the major goals of BI is to automate and integrate as many steps and functions as possible all way from pulling the data from different sources to the final analytics. Many of these processes such as ETL can be automated but it is obvious that analytics require some level of human input and also an organizational structure to support it (Burstein & Holsapple 2008). Building these automated processes, adjusting them to changing environment and also designing tools and applications need input from various people every day.

3.1.3. Strategic, tactical or operational BI?

Decisions can be divided into three levels. Strategic decisions are the highest level decisions focusing aiming to the long-term goals. These decisions answer for example questions like where a company should operate geographically and which products it should keep in its portfolio. Tactical decisions support strategic decisions and they tend to be medium-term decisions. An example of a tactical level decision could be a choice between company's own Business Intelligence servers and outsourced servers. Operational decisions, like which rights are given to certain BI user group, are made every day and they support tactical decisions. (Bhushan & Rai 2004.) Business Intelligence can be divided in the same terms to answer the information needs of making different decisions. In Table 3.1 the business focus, the primary users, the time frame and the data type are presented for three types of Business Intelligence.

Table 3.1: The three types of BI according to White (2006).

	STRATEGIC BI	**TACTICAL BI**	**OPERATIONAL RIGHT-TIME BI**
Business focus	Achieve long-term business goals	Manage tactical initiatives to achieve strategic goals	Manage and optimize daily business operations
Primary users	Executives and business analysts	Senior managers, business analysts, and LOB[3] managers	LOB managers, LOB users, and operational systems
Time-frame	Months to years	Days to weeks to months	Intra-day
Data	Historical metrics (KPIs[4])	Historical metrics	Right-time metrics

The level on which corporate's Business Intelligence operates is usually related to the maturity of the existing BI solutions. Usually organizations which are just getting started focus more on ensuring that tactical information needs are met. After this is guaranteed they start to move towards more strategic approach of BI. (Hostmann 2007.) According to Friedmann and Hostmann (2004) it is crucial for BI or any other IT investment's success that it supports the strategic goals and the objectives. The strategic BI is usually connected to a buzzword Business Performance Management (BPM),

[3] LOB = Line of business

[4] KPI = Key business statistics, which measure a firm's performance in critical areas (BusinessDictionary 2010).

which originates in the beginning of the 2000s. In a nutshell, the basic idea is to find out how well business is doing and what it could do to act better. Burstein and Holsapple (2008) support a longer-term view emphasizing that information should be interpreted in the terms of strategic and tactical objectives. These reasons may be why operational approach to BI has been set aside in the first wave of Business Intelligence solutions. (Burstein and Holsapple 2008.)

However, integrated data and analytics are needed in operational environment as well. The operational BI has a strong linkage to another buzzword, Business Activity Monitoring (BAM). BAM focuses in the other hand more on the operational performance and the actions. (Burstein & Holsapple 2008.) The requirements of operational BI are more demanding to the technical execution. For operational decisions it is crucial that the data is up-to-date and therefore the data warehouses which BI uses should be in the real time. The requested extracts from the operational systems should be kept to a minimum at the same time because the operational work should not be interrupted. With today's solutions the data latency is a real problem of operational BI. Also there might be problems with the quality and the integration of data because there might not be time to validate the data at a desired level before using it. (McKnight 2007.)

There are distinct views whether Business Intelligence should answer operational needs of decision-makers. Some authors say that BI should adapt to different needs, no matter if they require real time information or not. They usually emphasize decision-makers' needs of immediate information. (McKnight 2007; Burstein and Holsapple 2008.) Sherman (2004) questions the need of real time analytics. He points out that most people are reviewing trends over a period, and in these cases frozen data is adequate. Because real-time approach would increase the noise and decrease the quality of data, he doubts that if the decision-makers could act reasonably based on real-time data. (Sherman 2004.) As shown in Table 3.1, the primary users of operational BI are LOB or operational system users. Therefore the number of operational BI users is remarkably higher than in strategic or tactical BI. Increased number of users demands more resource from the BI and increases different costs such as licenses, maintenance and education. Massive amounts of operational data may also result in a way of thinking that all the data is needed store in the data warehouse. However, business users care only their own needs, not anything other. If business initiative of BI is forgotten, the data warehousing may end up being very costly. (Sherman 2004.)

It is clear that one cannot dump the long-term or the real time operational view of Business Intelligence. However, usually the limited and small resources of BI are focused more on the strategic decision-making. This statement is supported by the results of different BI surveys. For example, according to the research made by BARC (2008), BI solutions were least used in operational departments such as purchasing, logistics and production.

3.1.4. Different BI users

As the information technology has developed rapidly during the last two decades, the evolution of Business Intelligence solutions has been fast as well. In the early days of BI solutions were designed for and used by top-level executives and decision makers. Many of these solutions were fixed reports and analysis tailored for user-specific needs. (IBM 2009a.) However, nowadays the variety of business users who work with BI outputs is much bigger: the level of involvement varies from occasional users to power users from almost every department of the organization (Miller et al. 2006; BARC 2008; Bustein & Hosapple 2008). There might be two major reasons behind the expansion of user base: the first is the increased awareness of BI solutions and another one is the development of BI tools. Today's BI tools are more flexible and easier to be customized. For example, one can create a standard dashboard view which can easily be customized and filtered for multiple users using only the information about their position and location in the organization. (IBM 2009a.)

IBM (2009a) has classified different BI users into three four categories: casual and extended enterprise users, business managers, power users and IT administrators and developers. This division and their proportion of whole "BI cake" can be seen in Figure 3.3.

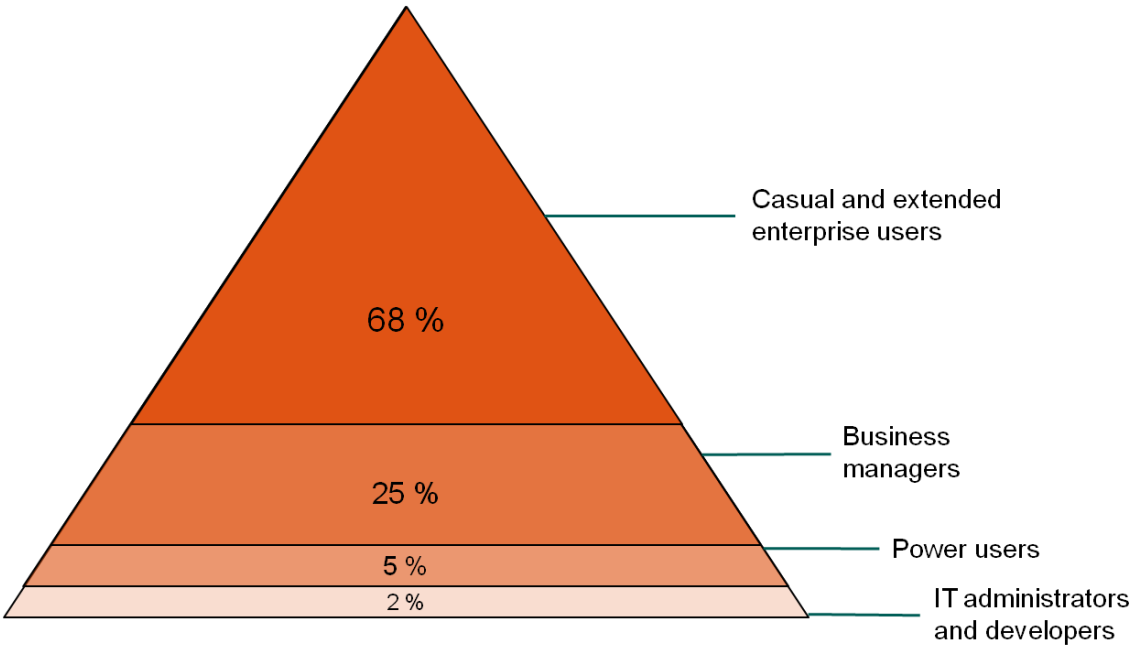

Figure 3.3: Different BI users and their proportion of organizations BI users (IBM 2009a, p. 6).

The biggest user group, casual business users, is mostly interested in regular and standardized reports. These normal users are familiar with basic spreadsheets rather than complex manipulation of additional features which some of them may find overwhelming. Earlier researches show that the best solutions for casual users present

information clearly by using simple business terms rather than technical jargon. Their BI solutions should be easy to access, easy to use and they should fit their users' daily work without an additional effort. The integration with company's internal search engines or familiarity of web-based interfaces are just few things to be mentioned how to lower the barrier of using new solutions. (Sherman 2003a; Sherman 2003b; Burstein & Holsapple 2008; IBM 2009a.)

The second biggest user group, business managers, has different needs than casual users. The business managers need both high-level but also lower, more detailed-level information. They are usually interested to observe their numbers from different angles and dimensions, such as business type or product group and drill down from higher level to lower level information. Although the business managers need more analytical reports and tools, their needs have remained quite the same over a time. (IBM 2009a.) IBM (2009a) put executives in the same category with business managers because their needs are quite close including standardized but a little more analytical reports. Of course the reports of executives are usually more custom-coded and specified for their particular needs. However, Sherman (2003b) puts that most executives have their own efficient and dynamic BI tools, their staff. This implies that executives would only need high-level information related to their key initiatives via dashboards. Neither of these views is wrong, it just depends on habits of the executives: there are executives who are more technically-orientated and more interested to do their own analysis and there are also executives who are totally satisfied with the standardized high-level information.

Power users, as the name indicates, are the users who use BI applications daily and demand usually the most sophisticated BI solutions. Typical power users are business analysts, controllers and some product managers who have Profit & Loss Statement (P&L) responsibility. These people need to go beyond the basic reporting and find the correlations and answer "why?" and "what if?" questions. These analyses need more sophisticated tools like OLAP cubes and scenario modeling of which an average business user could not care less. The power users also include other analysts like statistical and financial analysts who need tools for example for their data and text mining. (Sherman 2003a; IBM 2009a.) As the development of BI tools has been rapid, Sherman (2003a) questions the true need of them in some occasions. He claims that sometimes the power user may be too interested in the tools than the real business needs. This is why the department answering for the tools should be aware of different possibilities and what they really need.

The last and the least user group includes the IT administration and the BI developers who are in responsible of the Business Intelligence solutions. This group might have some self-service reporting, which however may be neglected as the needs of the business users must be answered. (IBM 2009a.) However, BI's self-reporting is important because reporting service should be controller as well. Many times the number of different reports explodes as BI department tries to answer all arising

business needs. The needs and demands of different tools should be carefully examined because people do not always actually know what they really need to meet their objectives. According to Eckerson (2003), 75 % of users of historical data principally use only routine reports that describe what happened. This figure gives an insight to the true needs of most BI users.

3.1.5. Towards collaborative BI

As mentioned already in the introduction, Business Intelligence implementations in many organizations are often done separately and therefore these solutions lack the mutual integration. In large corporations there can be multiple BI systems each having for example their own tools, processes and data architectures (Wu et al. 2007). Another problem that BI often encounters is a lack of business initiative. In these implementations Business Intelligence is decoupled and in desynchronization from the business and operational systems where actually the initiative of BI should lay. Only independent knowledge workers are in responsible of BI activities and the results do not satisfy the needs of business. (Veryard 2005.)

A step towards a better BI is taken when different BI enquiries are taken as services. This perspective emphasizes the importance of decision-making support and internal service role of Business Intelligence. Veryard (2005) defines this as "Embedded BI". Next step is "Integrated BI" when a company can coordinate different BI activities with one another and synchronize them with the business and the operations as well. In this case the resources of BI can be used more efficiently and for example overlapping projects can be avoided. To get the most out of the Business Intelligence, its functioning should be well orchestrated and the collaboration between knowledge workers should be smooth. This level of BI Veryard (2005) calls "Collaborative BI". These four levels of BI are summarized in Table 3.2.

Table 3.2: Four levels of BI according to Veryard (2005).

	synchronized with business and operational systems	**internal coordination between enquiries**	**federated management or governance structure**
STAND-ALONE BI			
EMBEDDED BI	X		
INTEGRATED BI	x	x	
COLLABORATIVE BI	x	x	x

Veryard's categorization is following quite well how the BI is organized in companies in practice. The stand-Alone and the embedded BI describe well a traditional case where is multiple separated departmental BI solutions have been implemented. Depending on

the business initiative, the level of business synchronization may vary but there is usually no or only little coordination between different BI solutions. However, these implementations may answer needs of business users' well because they are often custom-built for users' particular needs. The integrated and the collaborative BI solutions demand more centralized BI organizations. Centralizing at least IT infrastructure one can achieve cost reductions but to get even more results from the collaborative BI one must have to centralize BI-related decision-making. The standards and the best practices of the analysis tools and the investments, broader coverage of BI utilization and reduced costs are just few benefits to be mentioned. However, there is always a trade-off between business users' flexibility and efficiency when the implementation of centralized BI organization such as Business Intelligence Competency Center is regarded. Business users will not easily embrace the consolidation which is why the change management will add more costs and require more time. (Sherman 2004; Ballard et al. 2005.) The centralized concept of Business Intelligence Competency Center will be discussed in more detail next.

3.2. Business Intelligence Competency Center

3.2.1. What is BICC for?

Originally the name of "Business Intelligence Competency Center" concept was used by research group Gartner in the beginning of 2000's. Like mentioned in previous chapter, Business Intelligence Competency Center (BICC) is a centralized organization specialized in running and supporting the BI functions. Most authors and organizations refer BICC to a cross-functional team consisting of analysts, business subject matter experts and technology or IT staff. This was also a part of original definition of BICC by Gartner (e.g. Miller et al. 2006; Graham 2008a; Baars et al. 2009 Hitachi 2009; IBM 2009b). The fundamental idea is to combine different competencies and skills with BICC (Figure 3.4). In the literature, BICC has established itself as the generally used name but still it is known for example as Centre of Excellence (COE), Competency Center (CC), Center of Knowledge or misspelled as Business Intelligence Competence Center or Centre. (Cognos 2006.)

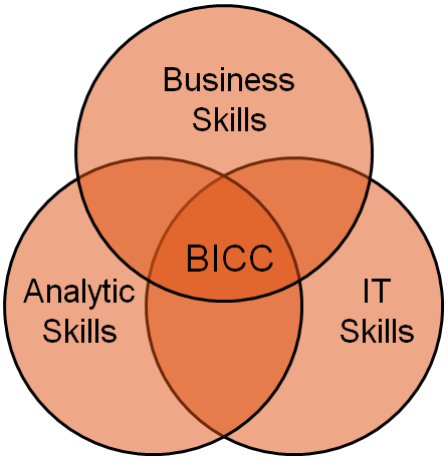

Figure 3.4: BICC combines different competences (Miller et al. 2006).

There are two main ideas which the concept of BICC builds on. The first is to combine organization's different BI efforts together to obtain more efficient and effective Business Intelligence. With a BICC organization the goal is to have repeated BI deployments which are tied together as a BI program rather than the sum of separate BI projects (Cognos 2006; Hitachi 2009). The benefits of these are discussed in more detail later. The second idea is to complete different competencies of the human capital to obtain a better support of decision-making. (Miller et al. 2006.) In most of the times the initiatives and the coordination of Business Intelligence solutions have been based on the IT department (Miller et al. 2006). This creates a good technical competence base for Business Intelligence solutions which is without a question an important thing but IT specialists tend to lack the understanding of the particular business. Usually the attitude against the IT department is also initially wrong and technical jargon used by IT does not help the promotion of BI either. (Bashein & Markus 1997.) A formal organization of BICC tries to answer this problem complementing different competencies of IT, business and analysts by putting them to work together. Ranjan (2008, p. 463) has said that one of the reasons "behind a successful BI is a tie between business and information technology". This view is widely accepted for example by Sherman (2003b) who says that "good relationship between IT and business users is important" and by Miller et al. (2006) who put that a BICC works as linking pins between the user side and the infrastructure provision.

Miller et al. (2006, p. 36) have listed comprehensively the functional areas in the BICC (Figure 3.5). All of these eight functional areas are covered and agreed by many authors and faces (e.g. Strange & Hostmann 2003; Cognos 2006; Graham 2008a; Hitachi 2009; HP 2009; IBM 2009b) although the categorizing and the naming practices varies a little. In practice, very few Business Intelligence Competency Centers are covering all of these functionalities and the centralized functions usually vary case by case. Anyhow, all of these functions should be cover in some way in every organization no matter who is in responsible after all. (Miller 2006.)

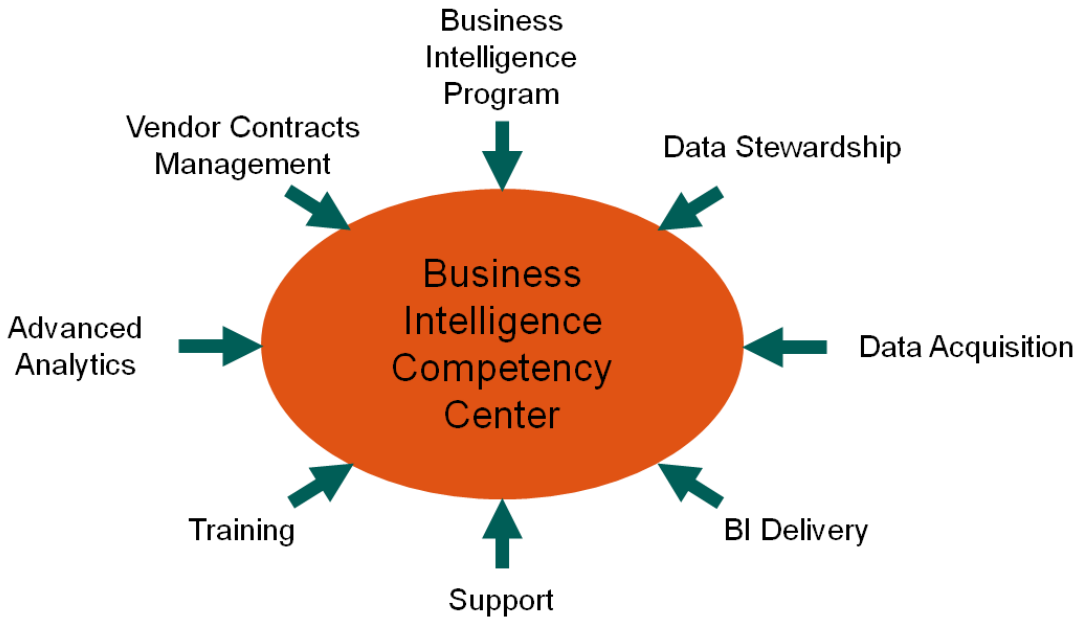

Figure 3.5: Functional areas in the BICC (Miller et al. 2006, p. 36).

Business Intelligence Program is the primary function of BICC which oversees and coordinates the BI activities so that the BI strategy is executed and the objectives are met. It is the interface to the business units by defining the needs and also by sharing BI knowledge throughout the organization. Data stewardship and data acquisition are related more technical side including data warehousing, administering metadata, integrating data and being responsible over the data quality. BI delivery includes taking care of different tools and applications to deliver and distribute the information. This actually transforms the data in warehouses into Business Intelligence that can be utilized by the business users. Support function covers supporting different BI problems. In most of the time the problems are not related to BI so they are usually passed forwards to the general service desk or the software vendors. Training function is in responsible of training business users both BI concepts and applications. In some organizations training function may be in responsible of the certifications as well. Last function is to handle license- and contract-related issues which are remarkable part of BI because it is so IT-orientated all the way from the data warehousing to the interface with business users. (Miller et al. 2006.)

The diffusion of BICCs has been studied mostly by the advocates of it. In 2005 BetterManagement's survey referred by Miller et al. (2006) showed that 23 % of companies had implemented a BICC. In 2006, according to Computerworld's (2006) survey 20 % of enterprises with more than $500 million in revenue had implemented a BICC where only 6 % of companies with less than $500m in revenue had it. Chew & Fuchs (2007) approximated a year later that 20 to 30 % of large and medium-sized companies have a formal Business Intelligence Competency Center. Although the diffusion of BICC has been quite good, according to research done by BARC in 2008, 42 % of 271 respondents were not familiar at all with the concept of BICC before the

study. This strong duality is remarkable considering that BICC has been proved to improve BI efforts in many cases (e.g. Barlow 2006; Computerworld 2006; BARC 2008). It may be that many respondents and organizations behind the surveys share different names or definitions of BICC although they are talking fundamentally about the same thing. Another possibility is that BICC has been ignored among many other hype terms related to Business Intelligence and Performance Management during the last decade (Bitterer et al. 2007). The measurement of Business Intelligence and its efforts' on ROI is not straightforward as well, which may increase suspicion towards the results of BICC implementations (Lönnqvist & Pirttimäki 2006).

3.2.2. BICC organization

The key thing that distinguishes BICC from other embedded, integrated or collaborative BI attempts is its formal organization. Graham (2008a) emphasizes that for sustainable information empowerment one needs to have a formal organizational structure because the information requires ongoing maintenance and support. According to surveys, in most of the times BICC is an established department under IT department or a virtual but formal cross-department group working together. Established separate departments are more popular in bigger companies what is understandable considering their bigger resources. Embedding BICC to company's organizational structure may also differ: BICC members may vary project by project or BICC may be a staff function. (Computerworld 2006; BARC 2008.) In most of the occasions BICC organizations are established initially with part-time roles filled by individuals who have other responsibilities. This may put a label of some department on BICC and default its neutrality if the roots are strongly based on one department. These part-time roles usually evolve into full-time positions over a time if the early efforts of BICC have been successful and there is a clear need to expand formal and permanent BICC. (Graham 2008a; BARC 2008.)

Because BICC is a cross-functional group, many authors recommend it should have executive or Vice President -level sponsorship (e.g.; Miller et al. 2006; Henschen 2008; Hitachi 2009; HP 2009; IBM 2009). This sponsorship should ultimately guarantee that new actions have business initiative. A high-level sponsorship also improves organization's buy-in of BI and makes sure that the BI actions have alignment with organizations strategic goals as well. In traditional profile of BICC the executive level sponsor is either CIO or CFO who is also a member of the steering group or committee that controls the work of BICC. The steering group should also have other high-level business decision maker members who are used to rely on analytic information and are ready to act as sponsors and the change agents of BICC. (Cognos 2006; Henschen 2008; HP; 2009; IBM 2009.) The idea of including key consumers in the steering group from all the areas such as finance, operations and marketing is tempting but in practice the efficiency of decision-making suffers as the headcount of steering group increases. One

should try to find another ways to get sponsors and change agents behind the BICC of those groups who have been left outside the steering group.

The staffing of Business Intelligence Competency Center depends mostly on the objectives and the functional areas that BICC is wanted to cover. Like other staffing questions, in BICC it is not only about the skills and knowledge which people have but about the overall competence which covers also the behavior of individuals. (Miller et al. 2006.) An ignored issue in the literature considering the staffing of BICC is the background of individuals. Selling the new concept of centralized BI to business is easier if people from both parties share similar work experience or they have done business together. Conversely, earlier disagreements or power struggles may create a rocky road to success.

The literature suggests many different roles to BICC's own organization and some supporting roles from out of it (e.g. Miller et al. 2006; Graham 2008b; HP 2009). One thing they have in common is the need to answer the recognized necessity of IT and business alignment (Rockart et al. 1996; Bashein & Markus 1997; Reich & Benbasat 2000). Understanding the business, such as their currently pressing issues and KPIs, helps BICC to answer the needs of business users better and therefore promote their commitment. Another thing the literature agrees on is the need for clear leadership of BICC. This person has obviously overall responsibility of BICC's functions but first of all he or she makes sure that the centralized BI actions are coordinated with one another and BI strategy is followed. (Miller et al. 2006.) Once again, to make sure that BICC has business initiative, some authors suggest that the BI team leader should have a business background with strong technological understanding (Graham 2008b).

3.2.3. Benefits of BICC

Although the concept of BICC is almost a decade old, it has not been under intensive academic research. The benefits of BICC have been brought out mostly by the advocates of BICC but there are also a few research results of BICC implementations available. However, most benefits of BICC are self-evident and understandable with common sense, at least if BICC would function ideally.

The first and already earlier emphasized benefit of BICC is its capability to have a wider strategic impact. A common plan for BI deployments helps in the prioritization of projects and therefore helps in steering a big ship into the right direction. With BICC the standardization of KPIs through the whole organization is much easier than with separate departmental BI solutions. This standardization helps business to response to external changes more effectively. (Barlow 2006; Cognos 2006; Ranjan 2008; Hitachi 2009; IBM 2009.) Baars et al. (2009, p. 10) put that for decentralized BI organizations it is not impossible to enforce enterprise-wide stipulations to have a strategic impact, it is just much harder to do so. However, the strategic benefit of BICC does not come out

from the few surveys made of BICC (Computerworld 2006; Miller et al. 2006; BARC 2008).

A self-evident benefit of BICC which is also proven by surveys is reduced costs (Computerworld 2006; Miller et al. 2006; BARC 2008). In most BI environments there are multiple BI systems each having their own tools, overlapping projects and IT infrastructure. As BI covers all business functions and managerial levels, the technical and the organizational complexity increase as well. (Wu et al. 2007; Baars et al. 2009.) A BICC makes it easier to reduce the redundancy of on-going investments and therefore reduce overhead costs. Other functions and services are also cheaper to produce centrally because these are usually very labor-intensive operations under small load. With centralized BI the negotiation power and the economies of scale are better when the software and the license contracts are made. If the processes are standardized and the best practices have been taken in use, one may also obtain cost reductions due to the smaller lead time of BI deployments and projects. (Cognos 2006; SAS 2006; Hitachi 2009; IBM 2009.)

Business users, the customers of BICC, are more interested in the better outputs than decreased costs. Data quality issues, such as master data management and data validity, often improve when a step towards BICC is taken. This results in fewer information disagreements and in best case the single version of the truth may be obtained instead of multiple truths on which business users are hard to count. When the data is mastered well, it gives BI developers also possibilities to use it more efficiently and therefore to offer new possibilities for analytics. (Baars et al. 2009; Hitachi 2009; IBM 2009.) In addition to better quality of data, implementing common terms and definitions help business to communicate with each other (Graham 2008b). Another visible improvement to business users with BICC are smaller lead times of BI deployments and projects. Sharing the best practices also improves the quality of deployments and may decrease the risk associated with new implementations (Ranjan 2008). As mentioned in earlier chapters, most of the BI users appreciate the ease of use of BI applications. Tools may remain the same but standardization of different tools usually improves the support from BICC but also from the colleges which is why end-users learn tools faster and become productive more quickly (Ranjan 2008; IBM 2009).

Many of these improvements, such as the strategic impact, reduced costs and better outputs feel rational but after all of their true impacts are hard to be measured or quantified. Because determining the exact ROI of BICC implementation is impossible in practice, Chew and Fuchs (2007) have listed few success factories that are related moving towards centralized BI and which are easy to measure. A high degree of the number of reports and analyses in relation to the number of business users indicate the efficiency of BICC and redundancy removed compared to previous departmental solutions. Also, one can easily measure the costs of producing BI outputs and decreased number of different tools and service providers which usually indicate decreased costs

as well. The strategic impact and also the quality of BI outputs can be mapped by the number of business users using the BICC facilities. (Chew & Fuchs 2007.)

3.2.4. Downsides and obstacles of centralized BI

The downsides of moving towards centralized BICC are mostly well ignored in the existing literature because the authors of BICC have been also the advocates of it. The advocates of BICC have approved the fact that one size does not fit all (e.g. Cognos 2006) but they have not brought out the point that in some occasions it may be smarter to keep the current state of decentralized and departmental BI. Baars et al. (2009) says that it is still unclear under which conditions a BICC should be preferred over a decentralized approach. To find the right balance between the centralization and the decentralization, Ruddy (2006) listed "rightshoring" as one of ten BI trends already few years ago. The idea is to determine the right mix of onsite, offsite and offshore work in particular case.

It is clear that more centralized solutions and increased standardization of tools, reports and processes reduce the flexibility of end users of BI. With a local departmental BI solution a business user can get more easily a custom-made and user-specified report that answered his or her needs perfectly. In transition to BICC this end user may have to relinquish this report or at least the technical support of it. In the worst case, the standardizations and the reduced number of available reports may result in even worse decisions. In most occasions also different tools for local needs have been implemented over the time. Again, the standardization may reduce flexibility and business users may even lose crucial functionalities in transition to corporate-wide tools. Sometimes one may face problems with managers who resist providing new tools to their subordinates. The total costs of ownership and the hidden costs should be carefully considered and examined: for example training and learning a new tool take always both time and money. First of all, one should think how the standardization affects on the business users' capabilities to do their daily job. It is obvious that they are not going to embrace the consolidation easily: change resistance and change management will increase costs and need more time. (Sherman 2004; De Voe & Neal 2005.)

There are other challenges than the standardization related to full deployment of BI through BICC. Setting up a competency center requires skilled and available people. Although previous BI decentralized efforts have needed their resources as well, the competencies of these people may not meet the demands of running a centralized BICC. Also many resources may be strongly tool- or process-related which make it hard to embed them to BICC. There might also appear some cultural resistance within departmental BI units: concerns about the future and the changes in the way of doing things are just few to be mentioned. There are also big technical challenges in integrating and consolidating data warehouses: for example the data may not be timely correct or it may not be clean after consolidating it. Problems with data quality may

results in loss of credibility with end users if they are used to the single version of truth and clean data. Rebuilding trust is a major challenge just like with external customers. The last major challenge faced in transition to BICC is unclear results. Showing a clear cause-and-effect relation to the managers is difficult and getting remarkable visible results may take a lot of time. (De Voe & Neal 2005.)

3.2.5. BICC implementation as an organizational change

BICC implementations and transitions to centralized BI solutions have not been under a heavy academic research as mentioned before. However, multiple BICC advocates have written about the implementation process and how the organizational change should be dealt. These guidelines of BICC implementations follow quite closely the points that more general research of organizational change and change management have presented: high-level sponsorship, careful planning, creating and communicating a vision, expanding the scope and sponsorship after successful smaller steps etc. (Cognos 2006; Miller 2006; Chew & Fuchs 2007; Henschen 2008; Hitachi 2009; IBM 2009.) Millet et al. (2006) have even created a three-stage framework for BICC implementation which follows Kurt Lewin's model almost identically. However, two things are remarkable considering the existing BICC literature: only little has been written about establishing a readiness for a change and institutionalizing the change, and very few authors have considered the resisting and the change promoting forces from the perspective of the end users of BI applications.

Kotter's (1995) or Lewin's model (Pinnington & Edwards 2000) both start with a stage of creating readiness for a change. BICC literature argues well the justification of centralized BI and how it should be sold as support organization to top-level managers but it does not consider how business users' sense of urgency should be established. De Voe & Neal (2005) among many other authors just focus on emphasizing the importance of effective communication and argumentation for why the change is worth of efforts but they do not bring out any concrete arguments to be used. The three-stage BICC implementation model created by Miller et al. (2006) has even own phase for creating readiness of change but again it deals almost only with creating the sense of urgency among top-level managers.

Chew and Fuchs (2007) suggest that BICC needs quick results in its early stages but if earlier BI solutions have been adequate it is much harder to convince why the step towards centralized BI should be taken. Cognos (2006) suggests that a pilot project should be executed and then possible positive results should be communicated. It may still be hard to argue the very first steps of moving towards centralized BI if there is not too much to be complained about the status quo. Therefore in a pilot project one should be able to create a superior BI solution to business users that overcomes their expectations. However, developing a new BI solution may be hard to be funded if earlier solutions were adequate for business. (Cognos 2006.)

HP (2009) is one of the only faces who pay attention to the importance of group dynamics and individuals in creating the readiness and institutionalizing the change towards centralized BICC. They suggest that BICC's team members from business should become sponsors of the change initiatives and change agents who drive the cultural change and try to overcome the resistance. BICC's team members from business should represent key consumers of information from finance, operations, and sales and marketing. (HP 2009.) This kind of participation and engagement is familiar from the literature of more general change management but it has not been widely discussed in the literature of BICC and centralized BI. In addition to participating different key consumers of information, HP (2009) suggests that senior HR representative is often overlooked resource during the change process who could help for example with culture change issues.

The extensive literature review of chapters 2 and 3 has covered both the change resistance and the change management research, and it has also discussed the basics of Business Intelligence and centralized Business Intelligence Competence Center to create an understanding of case environment's different characteristics. The literature review of BICC showed that the existing theory of BICC does not answer the question of end user engagement very comprehensively, and especially it lacked concrete means and methods which could be used to enhance the engagement in transition to centralized BI. However, more mature change management literature with its multiple theories and researches gives a good basis for examination of business user engagement to BICC through the research material.

4. RESEARCH METHOD AND MATERIAL

4.1. Case method and research material

4.1.1. Material collection

As mention in the introduction, the constructive research approach was taken to answer the questions of more applied research. A case study gives a chance to get rich qualitative research material which helps answering the practical "how" research questions in the case context. Participating the daily work in the case company and especially dealing with the problems that are very close to the research questions offered a great chance to get rich material by observation. The personal interaction with business users helped in creating mutual trust which enabled also completing observations with unstructured and informal interviews and questions. The dual practitioner-researcher role not only gave a good access to data but also gave the knowledge of organization which helped in collecting material through observation and interviews and creating the case descriptions. However, as a practitioner-researcher some actions may have been promoted during the observations which may have caused little biased research material.

The research material of this thesis is divided into two as the material is based on two different BI solution development projects: PAS management reporting and FC management reporting (Figure 4.1). The researcher had a dual participant-observer role as he was a member of case organization since March 2010 when the second examined project was kicked off. Although there was a possibility to continue observations even after the project, research material collection was cut in the end of July due to tight time scale of the research. At this time the testing of FC's developed BI solutions was just about end. The material and description of the first project, PAS management reporting, is based on the unstructured interviews of particular project's manager. The first project was run in 2009 which is approximately one year before the second project. One-year time span between the project and the interviews may result in an incomplete case description where something is missing or forgot. Since March 2010 the observations were made by the researcher considering the daily post-project actions.

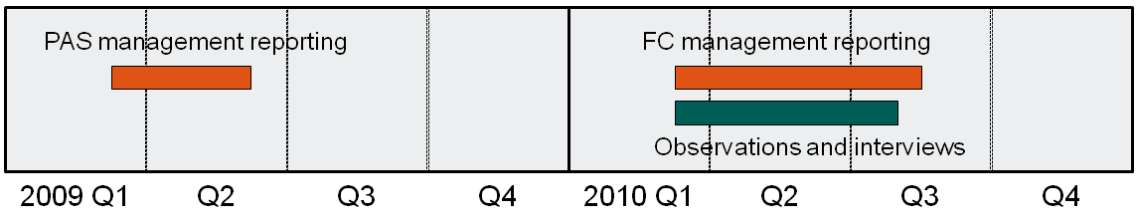

Figure 4.1: The projects and the collection of the research material.

The second project, FC management reporting, was carried out in 2010 about a year after the first one. Because the researcher was the project manager himself, most of the notes were made immediately as they occurred during the training sessions. Multiple notes and memos were also saved from different meetings. When needed, the notes were completed by asking different business users and stakeholders certain questions in the next meeting, by phone or by email. The researcher participated as project manager almost everything that was related to the project which made possible to collect very rich research material. Being a member of organization and working daily with particular issues made the access to the data and information really good. According to Yin (2009) this creates a good base to obtain holistic and in-depth view of the case.

4.1.2. Interviews and observations

The material of the execution of PAS management reporting project and the day-to-day actions until March 2010 was obtained completely by interviewing the manager of particular project, present reporting manager of Metso Automation. The project manager himself was also one of the future solution's business users at the time of the development project which made possible to get end in-depth end user's point of view. One major interview was made and it was filled later with multiple informal discussions. The interview itself was also very informal structuring on open-ended questions which were verging on casual discussion sometimes. An extract from the interview notes can be seen in Appendix 1. There was also almost daily interaction between researcher and the project manager which made possible to double-check issues and complete the case description if needed. Because PAS management reporting project was carried out only by two persons of whom another one had changed his employer before the time of the interviews, the first case description could not be completed with other interviews. Another factor that weakens the reliability of the research is the fact that there was over a year between the execution of PAS management reporting project and the interviews. Some things may have been forgotten or some unique things may have been emphasized too much.

The research material of FC management reporting project was collected during the project meetings and the training sessions of business testers. In multiple project meetings a Business Controller, who was also a future end user of particular project's solution, was asked single questions as they arose. Notes were made also during the

training sessions on the basis of observation and single questions. Because the training sessions during the research process were arranged only for people who were attending the testing, the attendees represented only one homogenous group of future business users: the testers were Controllers being responsible for different areas, product lines or sales and service reporting in general. The total number of trained end users during the research process was eleven. Because most of the interviewed people and people who were participating the meetings and the training sessions were already or the future business users, one could get a good end users' point of view for the research material of both PAS and FC management reporting projects.

Observation notes were also made during multiple miscellaneous meetings covering topics of reporting in general, other development projects, working methods of BICC and data warehousing. An extract from these notes can be found in Appendix 2. These meetings were attended by mostly data warehouse architects and report developers but also by some business representatives who were already using developed management reporting solution or who were going to be use it in the first place. The notes from these meetings encompassed day-to-day work of Business Reporting Team rather than single development projects. Therefore these notes completed the research material of both PAS and FC management reporting projects.

Typical methodological limitations are related to the interviews and the observations of this thesis. For interviews there is a chance that poor questions have been asked. Because the researcher was a new member of particular organization, there is a chance of reflexivity of both the interviews and observations: the presence might have caused change in what people did or what they said. Also, as the time went by and the organization became more familiar to the researcher, some basic questions might have been forgotten to be asked or during the observation some facts might have been missed as they have seemed too obvious or common. The documentation tools were not very highly structured to build consistency and quality control. However, constant direct observation gave a chance to record the events in their real context and also in real time which is definitely a clear benefit of the used research method.

4.1.3. Material analysis

The analysis of qualitative data is considered to be a demanding process and there is no standardized procedure to do it. However, there are multiple ways available to get something out of the collection of non-numerical and non-standardized data. Saunders et al. (2009) have divided them into three main types: summarizing data, categorizing data or structuring data using narrative. Data summarizing aims to bring out the key points and themes and possibly identify relationships between them. Another way is to categorize chunks of data into predefined or self-created categories and then recognize relationships or develop the categories further. Data can be structured using narrative that organizes the data temporally and with regard to its social or organizational context.

These main procedures can be used on one's own or they can be combined to support the interpretation of qualitative data. (Saunders et al. 2009.)

In this thesis, the shattered data from observations and interviews is first put in the form of stories. Two narratives are built from the perspective of project manager to give a rich description how the BI development projects proceeded, which methods of engagement were used and which challenges were met. Because there is very little written about BI solution development projects, these stories give a great chance to compare two separate but almost quite identical projects and to compare how the means and methods differ as company moves towards centralized BICC.

After the narratives the data of both projects are put together categorizing it using earlier presented Lewin's change process framework. Although the framework is not just simple three-stage model for change management, it can be used to categorize the means and methods used during the projects and daily work of BICC into three categories. Another goal in addition to categorizing the data is to find out relationships between taken engagement actions and reflect it to the existing literature.

4.2. Case environment

4.2.1. Metso Corporation and Metso Automation

Metso Corporation is a globally operating Finnish technology and service supplier specialized in mining, construction, power generation, oil and gas, recycling, and pulp and paper industries. In 2009 Metso's net sales was 5,016 million euros declining 22 % from the figures of 2008 due to the global economic crisis (Figure 4.2). Over 40 % of net sales came from services. In over 300 units in more than 50 countries Metso has a little over 27,000 employees. A little less than 50 % of net sales and a little more than 50 % of personnel came from entities of Europe. (Metso 2010.)

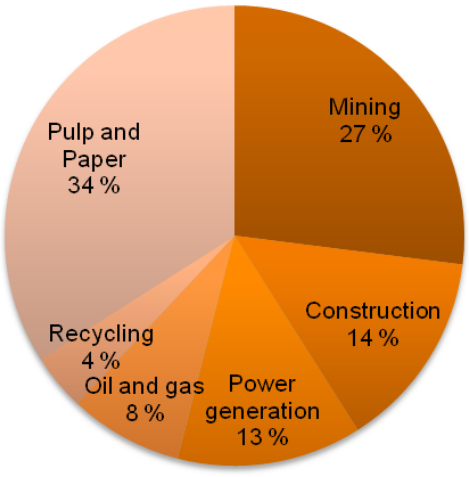

Figure 4.2: Metso's 2009 net sales by customer industry (Metso 2010).

Metso has divided its business in its latest major organization restructure into three segments: Mining and Construction Technology (MCT), Energy and Environment Technology (EET), and Paper and Fiber Technology (PFT). This thesis' case organization, Metso Automation (MA or ABL), is one of three business lines of EET. Its products and services consist of energy and process industry automation and information management application networks and systems, production process measurement systems and analyzers, and more traditional control valves and smart shut-off valves. In 2009 Metso Automation had 675 million euros in revenue. (Metso 2010.)

Metso Automation has two product lines: Process Automation Systems (PAS) and Flow Control (Figure 4.3). In organization structure Flow Control Global is still divided into Flow Control (FC) and Flow Control North America (FC NA). The biggest difference between FC and PAS is the business type: PAS's business is project and service business whereas Flow Control has also a lot of day-to-day sales business. Also a significant difference between FC and PAS considering the topic of this thesis is the physical location in Finland: most of the PAS business is located in Tampere whereas FC is in Helsinki.

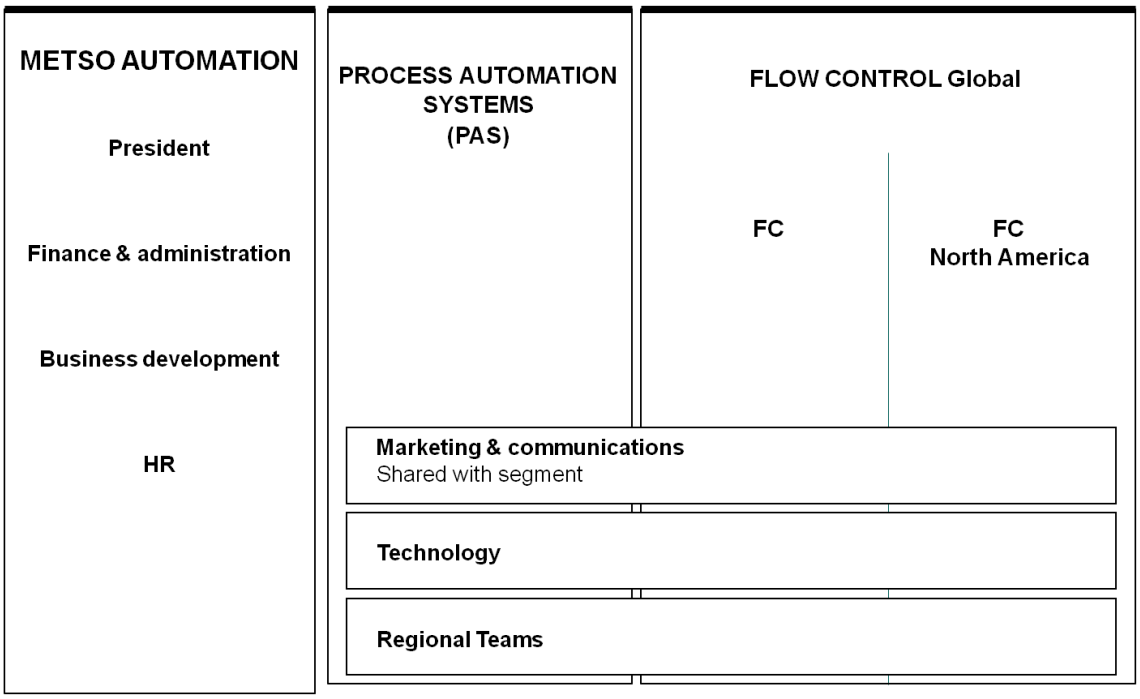

Figure 4.3: Metso Automation Business Line organization structure.

Both product lines share common marketing and communication and technology functions. PAS, FC and FC NA are also tied together with regional teams. Finance and administration, Business development and Human resources are also commonly shared Metso Automation's support functions. Under Finance and administration, and Business development one can find the essential roles of BICC: IT and Business Reporting Team respectively.

4.2.2. Change from decentralized BI to centralized BICC

Until 2007 Metso Automation's Business Intelligence had been in its infancy. Most of the people were not aware of more sophisticated BI tools and methods such as data warehouses or OLAP cubes. BI solutions were mostly built on financial management software and its Excel plug-ins which made them hard to update and coordinate. Also multiple Notes Databases had been created locally of which existence most people were not even aware of. People were in responsible of their own solutions which had no centralized support or maintenance at all. Few a little more sophisticated solutions had been created by FC North America but they had been left aside from bigger audience.

At first, there was no bigger decision for renewal of Business Intelligence in Metso Automation. The initiative was taken in 2007 by PAS's contemporary Vice President of Business Controlling and one Business Controller who both had earlier experience of centralized and developed BI solutions. They started to create awareness of new opportunities, methods and tools among PAS's personnel. After a while, in 2008, Business Intelligence solutions were suggested to be taken under the control of these two advocates when global Enterprise Resource Planning (GBI) project was in design phase. However, this proposal was not taken into action and report requirements and other BI needs of GBI project decided to be taken care of by separate BI and DW team and different subject experts of the project.

In spring 2009 a green light was shown by Senior Vice President of Finance and Administration to a separate pilot BI project proposal made by contemporary PAS's VP of Business Controlling and Business Controller. The pilot project was focused on the PAS's financial management data and reporting. The project's acceptance was great: it was taken into use by PAS's management and also regional managers. After the successful project forming static BI organization instead of uncoordinated doings was suggested. The permission was granted and in January 2010 Business Reporting Team (BRT) was formed under commonly shared Metso Automation's Finance and administration department. In the spring GBI project's separate BI and DW team started co-operation with BRT which could be considered to be the beginning of Metso Automation's Business Intelligence Competency Center.

4.2.3. How BICC is functioning

The organization of Metso Automation's BICC is not yet completely formal although Business Reporting Team and former BI and DW, present DW team, are co-operating daily. Together the two teams cover all but advanced analytics of BICC's functional areas presented earlier in Figure 3.5. Although MA's BICC is divided under two distinct departments, Finance & administration's IT department and Business development, and it has not common leader, BICC is controlled by a unified steering group led by Senior Vice President of Finance and Administration. Other members of steering group are the

Vice President of Financial Development, leader of BRT, Vice Presidents of Business Controlling of both PAS and FC, Metso Automation's head office's Senior Business Controller, Metso Automation's IT director, PAS's project department director and the leader of BICC's DW team. Steering group decides on project prioritization, resources and funding of projects and daily work. So far the decisions considering funding affect only on Business Reporting Team, and therefore only on the BI tools and Analytics described earlier in Figure 3.2.

Because Metso Automation's BICC has not been operating for long time and there have not been decent BI solutions available for business users, most of BICC's time is taken by new BI projects which expand the business user base of BICC. Besides these development projects BICC has to take care of the daily support and maintenance of already completed and existing BI solutions and tools. This sets remarkable challenges for time and resource allocation: on the other hand one should be able to complete development projects faster to expand the user base and therefore increase BI usage in organization. On the other hand, however, one should be able to guarantee with good day-to-day actions that projects are not done for nothing and BI solution implementations have been taken into use. In the future one should also be able to convince business users that existing BI solutions and tools are maintained and developed further.

4.2.4. The scope and the business users of case projects

The objectives of both PAS and FC management reporting projects were quite similar: to make data of financial management consolidation tool available for analysis and reporting via new reporting tool. In both PAS and FC financial figures were earlier reported and analyzed through financial management consolidation tool with spreadsheet program's plug-ins. This had had few problems, for example with reports' version management, availability and accessibility of reports and a lot of manual work. The idea of new management reporting was not to refine or add any new data, but just to make the same figures available in more user-friendly and in more functional environment. New solution was also able to provide its users both the strategic and the tactical BI by giving more possibilities to plot and filter the data. For PAS's project this considered two different financial management models where as for FC the original scope was about only one model.

In the first place predefined users of new reporting were the members of both business lines' expanded management teams which included the business line presidents and managers of product lines, sales and service, different regions, operations, logistics and HR. Also some Business Controllers of particular responsibility areas were in the original scope. These people are the ones whose engagement is under the closer examination in this research. The idea was to provide these users few visualizing dashboards including most important reports and OLAP cubes based on their specific

needs. On this basis one could say that the magnitude of the change was evolutionary because both the scope and the amplitude of the change were relatively small. The pace of the change was also relatively slow considering the magnitude of the change and the used time.

4.2.5. Other notable from the case environment

One thing that should be considered more carefully regarding the case environment of this thesis is the running global ERP project (GBI). As mentioned earlier, present DW team of BICC plays a double role while they are still the BI and DW team of particular project. During the GBI project this team has been responsible of building data warehouse for the basis of reporting. These reporting needs has been collected uncoordinatedly and there has been very little prioritization and long-term view by BI and DW answering these needs. This has resulted in a situation where business needs have been answered case-by-case creating custom-made solutions. However, in late spring 2010 a decision was made that all further report needs from GBI project should be channeled to BICC.

Although BICC is answerable for GBI project's future reporting needs, DW is still tied to finish what they have started earlier. This ties valuable and finite resources from other BICC's development projects. Also a global ERP project takes a lot of time from different people from business. This makes it harder to find right resources and time for business testing and training of new BI development projects.

5. RESULTS

The goal of this research was to find out different means and methods to overcome the resistance of change and therefore enhance business users' engagement to Business Intelligence Competency Center. The following narratives of both cases bring out answers to all three research questions: how to engage business users to Business Intelligence Competency Center, how means and methods of engagement differ between BI development projects as company moves towards centralized BICC, and what are the main challenges considering the engagement of business users to BICC. The narratives give also a rich description from managerial view to BI development projects of which have not been written much. After the narratives the second research question is discussed. Then Lewin's three-stage framework is used to sum up the project descriptions categorizing then arisen means and methods and reveal their mutual dynamics. After that the third research question is dealt and the conducted research and its results are discussed.

5.1. Project narratives

5.1.1. PAS management reporting

PAS management reporting project was a pilot project for centralized Business Intelligence in Metso Automation: no other BI solution development projects had not been done or was not in the sight yet excluding single report demands considering the implementation stage of GBI project. The original initiative for PAS management reporting project was made by PAS's contemporary Vice President of Business Controlling and contemporary PAS's Sales and Service Business Controller, later the manager of Business Reporting Team, based on their earlier experience on data warehouse based reporting and its opportunities and potential. The project was mainly run and managed by the Business Controller where the Vice President of Business Controlling played more the role of a change agent. The project manager had earlier experience of managing same kinds of DW based reporting projects which increased the credibility of the project management in the eyes of the end users. The funding for this new investment was applied from and approved by the president of PAS business line. This ensured a good support from the top management for particular project.

The project was kicked off in late February 2009. Data warehousing, star-schemas, framework models and reporting layer was created in co-operation with external consultants. Actually the only additional person who participated from PAS during the development phase of the project was the General Controller of PAS who had been the

process owner for PAS's financial management consolidation tool. She consulted the project team in questions related to data structures and hierarchies that were used in earlier reporting. She was also responsible of extracting the data from financial management tool during the project. Despite her General Controller role, she was not much in contact with PAS's expanded management team for who the reporting was initially designed, and although she would have been more in contact, she did not have chance to use the outcomes of the project. This may have created some dissatisfaction.

Most of the communication during the project to the expanded management team was done by the Vice President of Business Controlling who was also a member of particular management team. He informed the team in the beginning of the project about what will be done in which timeframe, and during the project about how the project is proceeding. He had a strong earlier experience and background related to business reporting. On that basis one could assume that he was a credible change agent. In addition, he had a chance for more personal encounter with the future business users as a member of expanded management team.

By the end of May 2009 the financial management data was available for the new tool. The tool was tested and the data was verified by the project manager himself. Based on this data management dashboards were designed by project's manager and PAS's Vice President of Business Controlling. In addition, comments for the design of dashboards were asked from two other Business Controllers who were supposed to use both dashboards and OLAP cubes by the time project was closed.

The dashboards and the OLAP cubes were received favorably and they were wanted to be taken into use as quickly as possible. The functionalities and the possibilities of the dashboards and the OLAP cubes, such as flexible drilling in hierarchical structure or trend charts comparing different scenarios, offered users much more than they were earlier provided. At the time new BI solution was introduced, most of the users were positively surprised of its capabilities. Earlier some of the managers were only provided fixed reports by their controllers but now they had a chance to take a look at the numbers by themselves and create easily different kinds of reports with dynamic filters.

The training of the new tool was made-to-order rather than coordinately and together. Only little training was provided to users and one counted on that users would contact for more training due to close relation if they needed it. The functionalities of simpler dashboards were gone through quickly in a meeting of the management team by Vice President of Business Controlling and more complex OLAP cubes designed for Controllers were trained separately by the project manager. Learning a new tool was not a problem for business users because there had not been new tools to be adopted for a long while and the tool was made to be used as easily as possible. Vice versa, people were willing to adopt a new one that had better functionalities and capabilities than previous solution with spreadsheet program's plug-ins. The adoption of a new tool was

even less painful because it had also a possibility to export reports and charts in familiar spreadsheet program's format. Although the tool itself was made easy to adopt, it still required a visit to another web page. This new Metso Automation's reporting portal was made familiar-looking using Metso's default colors and logo to enhance its adoption. However, it still lacked integration with other commonly used pages.

PAS management reporting project was closed in the end of May 2009 when dashboards and OLAP cubes were in daily use of PAS's expanded management team. The project was run in its original schedule taking a bit more than three months. Despite a warm welcome and flexible report filtering according to users' rights and interests, the user base of PAS management reporting did not expand much. Only a few people from service business were trained and given access to the new reporting tool. The only change in other close stakeholders was in the responsibility of data extractions from the financial management tool, which was assigned to another Controller outside the user base of new management reporting. This work is quite mechanic and it only adds a little burden to the one concerned without giving any payback. Again, this may create some dissatisfaction which may spread by word of mouth.

In the beginning of 2010 another model used in management reporting became invalid and it was replaced with a new one which was common to whole EET segment. This transition made some dashboards' list reports useless since newest data from 2010 was not updated anymore. These reports were not vital for business because they were also available from previously used finance management consolidation tool. However, although this could not be considered to be normal maintenance of existing solutions, it was likely to have a negative impact on satisfaction because new EET financial model was still not yet supported in the end of July 2010. Also other further development of PAS's management reporting has been frozen because BICC's other development projects has taken all the time and resources. Despite the lack of another financial model and development initiatives PAS's management reporting is under daily use and basic support.

Because PAS's management reporting project was a pilot BI project in Metso Automation a lot of uncertainties were related to it. One could not sell the project easily because advocates of particular project and BICC could not assure that this new reporting system will fly. One also did not have any concrete experiences or results from other projects on which one could have rely on. However, after the project was finished and a permission to launch other projects and to form a Business Reporting Team was granted, users of PAS management reporting solution started to get a confirmation that this could be the way how things are done in future. As a pilot project one could also specify the content easily because it was started from a scratch.

5.1.2. FC management reporting

The decision of Flow Control business line's management reporting project was made at the same time with the decision of forming Metso Automation's Business Reporting Team. After a successful PAS's management reporting pilot project the Senior Vice President of Finance and Administration of Metso Automation and EET segment, the head of BICC's steering group, decided to expand new business reporting to Flow Control business line. The purpose was to create same kind of management reporting that was created earlier for PAS, but to include also a specified report folder which could be used to automate monthly reporting. Because this was one of the first projects of centralized BI, FC management reporting project had to follow the footsteps of PAS's particular project so chasing the advantages of centralized solutions could be started immediately. The funding was granted by President of Metso Automation and EET segment which guaranteed FC management reporting project a true top-level support.

Unlike in the case of PAS management reporting, some business users had seen and heard from the previous reporting project. When the formation of BICC was granted, a reporting workshop was arranged where mostly miscellaneous Controllers from both PAS and FC were informed of the new reporting tool and solutions that were already available and those that will be developed in near future. Few Business Controllers and the VP of Business Controlling from FC management reporting preliminary user base were attending the workshop. The workshop was called by Senior Vice President of Finance and Administration which guaranteed again the top-level support. This reporting workshop not only opened the way for new reporting but also strengthened the feeling that this will be the tool and the way how reporting will be carried out in the future in Metso Automation. In addition to this workshop, Service Business Controller who was in preliminary user base of FC management reporting attended also another BICC's development project considering new GBI reporting which was supposed to use same tools. This constantly increasing coverage of new BI solutions is in important role of institutionalizing the change. Wider coverage and expanded user base increased people's awareness by word of mouth communication. However, on-going GBI project and its separate report development from centralized BI may have had created confusion of Metso Automation's BI practices and future development.

In the beginning of FC management reporting project the project manager, the researcher of this thesis, was a novice considering business reporting issues. This could have created some uncertainty among the business users when some questions about the system and future reporting arose during the project that could not be answered immediately and with confidence. Also the communication during the project faced a challenge whether to inform business users earlier when things were more uncertain or later when questions could be answered certainty but business users had to wait being uninformed. Due to the inexperience of the project manager, he was supported by PAS

management reporting project manager so one could utilize the lessons learned from PAS's management reporting project. For the first time, a framework and guidelines of BI development project in Metso Automation's BICC was used in case of running FC management reporting project.

Almost immediately after the approval for the project was granted, FC management reporting was kicked off officially in the beginning of the March 2010. From Flow Control business line a Business Controller and a business line's General Controller were selected into the project team. A certain amount of their following months' time was allocated also to the project. FC's Vice President of Business Controlling was also participating some of the meetings which considered the scope of the project. In addition to these meetings he was informed among the rest of the steering group of BICC once in two weeks. Much of the work in the beginning of the project was done in co-operation with FC's general Controller who was process owner of particular financial management model and had the knowledge of business dimensions and the access to extract the data from the original system. However, in April the General Controller was not available for the project anymore. Since this FC's Business Controller was the primary contact person and the responsibility of data extraction from source was moved to Metso Automation's General Controller who was out of the project's scope. Like in PAS management reporting, a person who did not benefit from the project got new workload.

Data warehousing, star schemas, framework models and reporting layer was done in co-operation with external consultants just like in the previous project. The testing of built solutions was divided into two: project manager's testing and two phases of business testing. In business testing some Controllers from the business user base were picked to verify and validate the content of the dashboards and OLAP cubes. They were selected so they represented the user base as well as possible covering the viewpoints of product lines, area management and service business management. First they were trained for the new tool and then they were given free hands and enough time taking their routines to test the content of a new solution. Additional time for testing was needed to be given because testing would have overlapped with Controller's busiest monthly reporting period and with their holidays. Although this stretched whole project's timetable, it was crucial because if too little time would have been given, dissatisfaction and resistance may have arisen. Conversely, the additional time made possible to get more ideas from business testers to develop existing BI solutions even better. Five different controllers participated the first phase of business testing, and five more was included in the second phase. An enthusiastic Area Controller who was left aside from this phase was even asking why she was not able to participate the first phase of testing as she had heard about the project somewhere else. This describes well the eagerness of end users that was related taking the new BI solution into use.

Business users were engaged to the new tool participating them already in the testing phase when they were given a chance to make suggestions and therefore to influence on the functionalities and the content of their future tool. The change to influence on the content was important because the reporting layer, which is actually the only visible part to end users, was originally specified on the base of PAS's solution. Unlike PAS management reporting project, this project encountered the trade-off between the customization of solution and the standardization. These questions considered everything from naming practices, for example whether to use Year-to-date or Cumulative, to the actual content of the dashboards. Because FC's project was the first one that was executed under centralized BI, in the end only little FC-specific customization changes were made to PAS's solution. Despite this, the superiority of new BI solution to the old ones was one of the major driving forces which made project's selling to FC's business users really easy. Whenever and whoever new solution was introduced, acceptance was warm and enthusiastic. The adoption and the learning of new tool were also painless due to the same reasons than in the case of PAS: there had not been new tools to be learnt for a while and the integration with the existing systems was smooth.

During the testing when the content of the dashboards and the cubes were discussed arose a need for operations' financial management model because a general EET wide model was not able to answer operations' information demand. Although preliminary user base for this new model was rather small, it was taken under the project to be implemented. This kind of project's expansion created confidence in that information demands are really listened and satisfied also in the future. On the other hand, there laid a risk that the whole project would have been delayed if new model's implementation encountered any unexpected problems.

Communication towards business users during the project was done from two sources. The first contact was always made by FC's Business Controller so users got a feeling that this project was not just another development project which had no business initiative at all. After that the project manager was contacting business users to ensure that they were given adequate trainings and they had straight communication channel to the development. Informing about new management reporting had been still quite unofficial within FC business line taking a place only in internal meetings between Controllers.

At the time of FC management reporting project also other BI development projects were kicked off and a clearer image of the future state of reporting in Metso Automation could be pictured. Ever more people became aware of new solutions which increased some of their expectations and lowered the chance of positive surprises. A concrete and communicated vision considering FC management reporting was that in future data would be extracted straight from the source system leaving the old financial management consolidation useless for new reporting. Although the old system was not

deserted this would mean that some processes should change and therefore some people's job descriptions would change. Because people deal with these things differently, one should be careful with communicating future visions. Expanding new business reporting may also create uncertainty among business users who are taking apart to development projects. They might fear that increased number of projects increase their workload as they would be used in future for example in testing phase.

Smooth co-operation with other stakeholders plays a significant role in diluting resisting forces of change. At the time of FC management reporting project the fragmented responsibility regarding reporting and data warehousing was more or less confusing because BI/DW team was answering the reporting needs of GBI project where as other reporting was centralized. This division and sometimes a little juxtaposition may have confused and affected negatively on the business users. It is also possible that some negative word of mouth could have spread from BI/W team about new centralized BI solutions.

5.1.3. BICC's effect on engaging business users

Observation of two different projects reveals that engagement process stays anything but fixed as the maturity of BICC increases. Engagement change regarding projects, its environment and the maturity of BICC. Changes, such as other projects, may affect on how change should be managed and what kind of resistance arises. The differences in engagement as the maturity of BICC increases are listed in table Table 5.1.

Table 5.1: BICC's effect on engaging business users.

Change as maturity increases	**Effect on engagement**
More established organization Public communication Greater coverage	Decreased need for creating awareness
Increased number of users Increased credibility Clearer future state	Decreased need for institutionalizing the change
Less customized solutions Decreased personal touch	Increased need for creating sense of ownership

The change unfreezing i.e. creating readiness for change is different process under Business Intelligence Competency Center. People's awareness and consciousness of BI solutions are better because information about projects and BI solutions is communicated in more public and because of greater coverage of centralized BI solutions the information is spread more efficiently. As the maturity of BICC increases the organization itself becomes more established and therefore recognized. This also decreases the need of creating awareness among business users. However, increased

awareness decreases the chance of a positive surprise which could be otherwise used as a method of engagement.

As the number of BI users increase as the maturity increases, centralized BI solutions has wider coverage. This gives people the feeling that "this is the way we do things around here" and people are engaged stronger after they have taken the solutions in use. As more established and recognized organization BICC's credibility increases as well which gives people a feeling that they can trust their BI solutions and they will be provided support also in the future. Young BICC may have smaller resources and unofficial organization which does not encourage long-term engagement. The future state of BI gets also clearer and trusted as BI strategy is executed as the maturity of BICC increases.

However, creating readiness to change may become harder because centralized BICC solutions scope may be defined stricter and business users do not have that good chance to affect on the specifications because of increased standardization. As the maturity increases the BICC becomes more faceless and personal touch may be lost because BI solutions are designed also for others than the closest business partners. The co-operation may also be less intensive if internal customer is not familiar earlier. On the other hand, less familiar customer must communicate more in order to create a sound understanding to developers. All in all, standardized solutions and decreased personal touch together decrease business users' sense of ownership of BI solutions.

5.2. Three-stage approach to BI development projects

5.2.1. Means and methods of engaging

Different means and methods of engaging considering research's two BI development project are summarized in Figure 5.1. The same means and methods in more detail were presented earlier in two narratives. Lewin's three-stage framework was used to give a compact managerial view of managing change process and engagement, and also to reveal dynamics between the means and methods of engagement. The means and methods are categorized according to their alignment to three stages of Lewin's change process model whether they are related to creating readiness for change (unfreeze), executing the change itself (change) or institutionalizing the change (refreeze). They are also tagged whether they appeared on pre-BICC project (PAS), BICC project (FC) or both (PAS & FC).

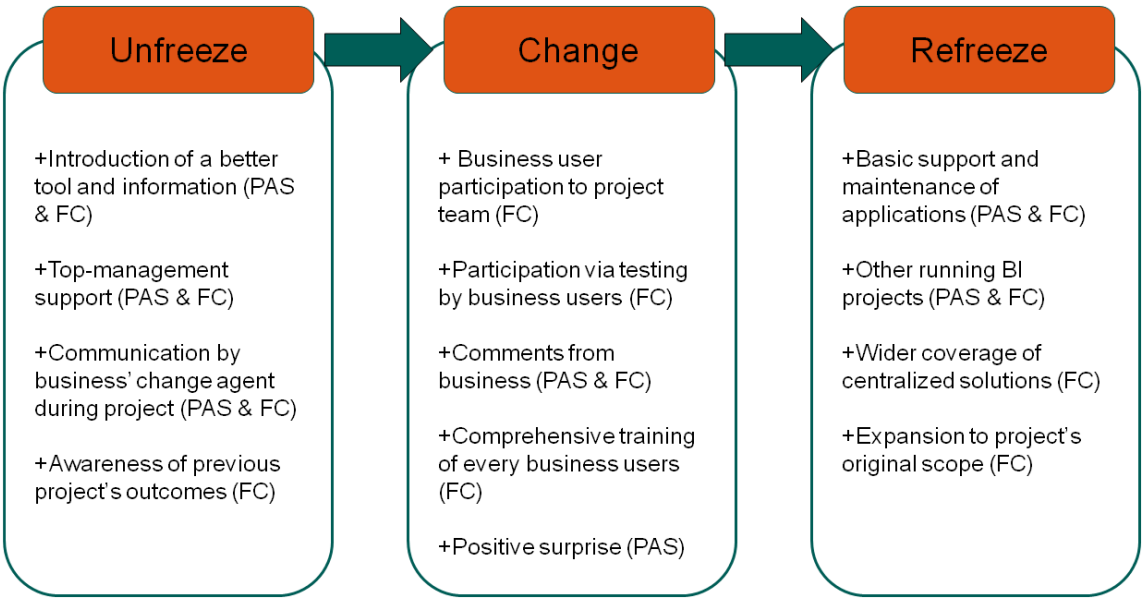

Figure 5.1: Means and methods of engaging business users to Business Intelligence Competency Center.

The research material of both projects indicated strongly that the superiority of developed BI solution is the key to engaging business users. Every business user who was presented the functionality and the content of the new solution welcomed it warmly and the solution was not needed to be sold later. The enthusiasm carried on all the way from presenting it the first time until the solution was implemented and taken into daily use, and no resistance to change was confronted. Due to the superiority of the developed solution one did not have to put so much effort on engaging the business users later: the tool was taken into daily use immediately after introducing it in production environment.

Although the importance of a new tool and a solution cannot be denied one still needs other means and methods to ensure the engagement of business users. Without top management support projects and change attempts tend to fail as literature has shown it. Also two-way communication has very crucial role in all three stages covering everything from sharing information of other's projects results and further development projects to listening business users in terms of their needs and suggestions for improvements.

Other major key to business users' engagement is to make them take part in a development project. Participation itself increases the sense of ownership but it strengthens well the other means and methods of engagement: developing better solutions, better two-way communication and more extensive training to guarantee painless implementation. One can take only a few people in the project management team but more people may be participated in the testing of a BI solution.

The refreezing of the change i.e. keeping the engagement of the business users is less in interconnected with creating the urgency of change and implementing the change itself. Keeping the users engaged requires convincing them that the big wheels keep on turning. This covers the maintenance of the existing solutions but also the further development. New development projects signal that BICC is the way of doing things and already existing solutions may be developed even further. Although the business users would adopt and take a new solution in use easily due to its superiority, engagement of business users should be maintained just like other customer relations.

5.2.2. Challenges of engagement

Different challenges of engaging business users arisen from project narratives are summarized in Figure 5.2. The challenges are also categorized according to their alignment to three stages of Lewin's change process model whether they are related to creating readiness for change (unfreeze), executing the change itself (change) or institutionalizing the change (refreeze). This way the challenges can be linked to earlier presented means and methods, and the dynamics between different challenges can be examined. Challenges are tagged whether they appeared on pre-BICC project (PAS), BICC project (FC) or both (PAS & FC).

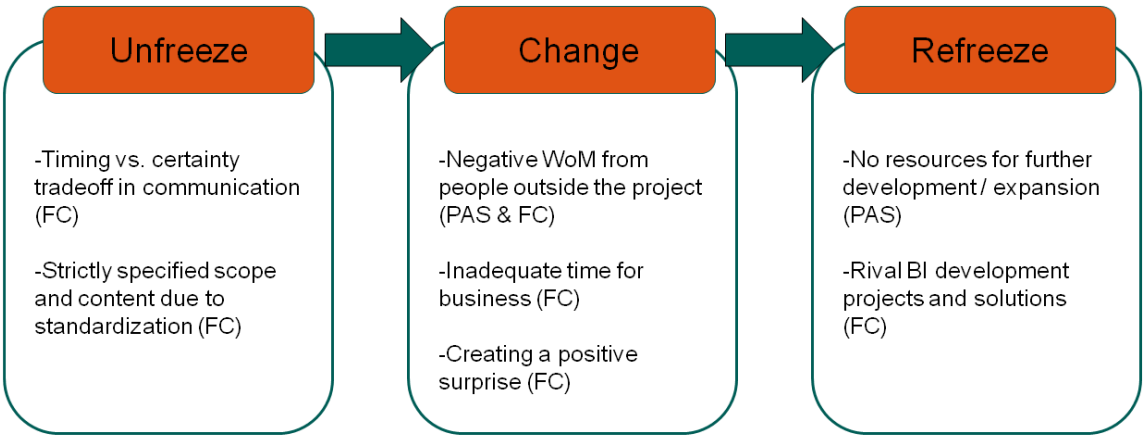

Figure 5.2: Challenges of engaging business users to Business Intelligence Competency Center.

Communication is crucial in engaging business users but the timing of it is challenging in dynamic environment. Early project-related communication increases the awareness but it is uncertain whether the message will change in future. Conversely, the message is more sure later but business users are longer uninformed. Creating awareness by good informative communication may reduce a chance to create a positive surprise when a solution is finally introduced but there lays a risk that the effect of a positive surprise does not overcome the resistance and dissatisfaction created by bad communication during the project. One should be able to find a way to keep the communication in satisfactory level and also to overcome the expectations when the solution is finally introduced.

More significant challenge is related to the scope and the content of the BI solution. In centralized BICC standardization limits the flexibility in BI solutions and their development projects. Business users do not get tailored solutions that satisfy their specific needs in best way which they might have got before when BI solutions and development projects were not centralized. The benefits of BICC should be carefully balance at BI solutions' expense because the superiority of BI solution is one of the key ways of engaging business users.

Different challenges of engagement are related to the participation of business users. One should be able to reserve adequate time of business users who are taking part to project. Especially business testers whose working time is not officially allocated to a project should be given enough time. In addition to time one should also be able to provide users something in exchange for their time. Business members who are not in the scope of particular project and have to give their effort may become easily frustrated and dissatisfied. There is also a chance that these people will turn to be resist agents who spread negative word of mouth. In addition to business users, one should also try to keep good relationships with other stakeholders. IT department, who in most occasions creates the basis for the reporting but does not work in the user interface, may end up to resist change if they feel they are overloaded and not engaged in developing BI solutions.

Once project is closed and developed BI solution is in use, one should be able to provide further development and maintenance, and also to expand project's original user base to institutionalize the change as well as possible. However, this may fail if resources are booked for other projects. This is likely especially if centralized BI solutions are not extensive yet and a broader coverage of BI is set as a major target. Other BI development projects and BI solutions from other faces set up a challenge to institutionalize the change. Especially when centralized BICC is tried to push through, these competing attempts may dilute the trust in centralized BI. In the worst case there might be overlapping solutions which offer business users confusing different versions of truth.

5.3. Discussion

The palette of the means and methods of engaging business users to Business Intelligence Competency Center found in this research was not especially surprising. The existing literature of more general change management had brought out earlier the same points from top-management literature to participation of stakeholders in a way or another. The literature of BI and BICC had brought out some points in more general level but before this it had lacked concrete means and methods which could be utilized in engaging business users. In anyway, the results show that theories of overcoming resistance to change can be extended and generalized to cover also business user engagement to BICC.

However, what was really stunning was the significance of superior BI solution although it has been said that BI is fueled by the utilization of the information it provides. After business users were introduced the new solution the execution of the project was smooth encountering almost no resistance of change. Although the original goal was not to focus on the importance of distinct factors, the significance of superior BI during the projects was remarkable and worth of highlighting. The earlier research combining the magnitude, the pace and the sequence of the chance has showed that high-impact elements should be introduced in the beginning of the chance. This is interesting, because a finding that came up from this research was that the timing, whether the solution was introduced to users already during the project or only just before the trainings, did not seem to make any difference in engaging business users to BICC. There lays a risk that this major single finding has been emphasized too much and the significance other means and methods has been diluted. However, all the notes of the interviews and the observations were made at the moment they occurred, which decreases the change of this risk. The final impact of introducing a superior BI solution is hard to be examined with this research material but in any case it can be considered to be really significant. If one element arises over the others this clearly, both academics and managers should carefully pay attention to it.

The objective of the research questions was to bring out how increased maturity affects on the engaging of business users to BICC. The results from one and half year period show that the engaging process should not stay fixed. One should focus on overcoming strengthening resisting forces that are created as standardization increases and business users' flexibility is lost as the maturity of BICC increases. Also the increased benefits of centralized BICC were confirmed: wider coverage and more extensive solutions increase the awareness for change and make the institutionalizing easier. However, extending the coverage of BICC, like in the case organization, ties resources to BI development projects and the maintenance and support is not the priority number one. In the literature this is often forgotten because the formation of BICC is considered to happen as the consolidation of earlier BI efforts. The evolutions, and also the structures of BICCs are undeniably different which make every single case unique. However, the case BICC of this research covers all but one functional areas of BICC which makes it a good point of comparison and more generalizable. Also the examined BI solution development projects included the basic components from data warehousing to creating the reporting layer and training the business users. Although this thesis revolves around the concept of BICC, managers and academics can consider also other forms of centralized Business Intelligence as the literature review showed that they have many things in common with BICC. The time scale of the examinations was one and half year which is long enough to bring out changes in engagement processes because the pace of the change considering the development of BICC was rapid. However, this research is not able to answer how the means and the methods of engagement would change in longer time period or when a BICC would have been established for longer time.

The third research question focused on to reveal challenges related to engaging business users to BICC. One self-evident, already presented challenge is business users' lost flexibility due to increased standardization. Again, combined to the importance of designed BI solution it should be carefully considered how much flexibility should be given at the expense of the economies of scale obtained by BICC. The optimum is surely dependent on the case but some theories could be developed in further researches. Communication was another significant and complex challenge that was faced in the case environment. The timing of formal communication and especially the importance of word of mouth communication should be taken into account in engaging business users. It came out from multiple dealings with different people that their awareness and naturally even some opinions were based on what they had heard from others. The field of social research is closely linked to the spread of word of mouth, but it also covers the dynamics of the resisting and the change promoting forces. Although the social examination was limited outside of this thesis, it should not be left aside from the discussion of engaging business users to BICC. People's statuses and their links to other people are just few things to be considered in the dynamics.

The validity, or in other words trustworthiness, in qualitative research aims for more credible and defensible results which may lead to the generalizability of the research. The one of the most important questions related to evidence of case research is the selection of the cases. The original idea of this research was not to have a big number of cases to do a macroscopic study but rather to have cases that represent the sample. Again, the idea was not to generalization to populations but to expand and generalize existing theories in which can be considered to be successful. As mentioned earlier, both the BICC and the BI development projects represent quite well the typical cases. The projects of this thesis were almost identical between in terms of their scope but the execution of them varied, naturally. However, a bigger question regarding this research is related to the collection of research material from cases: most of the first project's material was collected by interviews and the majority of the second project's material was obtained through observing. However, the data triangulation of both cases increases the credibility of the research.

6. CONCLUSIONS

The main objective of this research was to find different methods and means to engage business users to Business Intelligence Competency Center. The spectrum of the means and methods founded in the research followed well the mature existing literature of general organizational change management and the literature of Business Intelligence and BICC. Although new means or methods were not found, it turned out that the importance of developed BI solution in remarkable. Once a superior BI solution was offered to the business users, only little effort had to be put on their further engagement and diluting change resistance. Also the comparison of two different cases revealed that the timing of the solution's introduction did not make any difference which is opposite to existing literature which suggests that high-impact elements should be introduced in the beginning of the change process. However, it also appeared that one major mean of engagement needs other means and methods to support the engagement and maintaining the engagement in the future as well.

The other two objectives of this thesis were to find out how the increased maturity of BICC affects on the engagement and what challenges are related to engagement of business users. It was found out that as the maturity of BICC increases the means and the methods should change as well. Increased coverage of centralized BI solutions helps in creating the awareness and institutionalizing the change, but it other challenges of engagement arise as the standardization decreases the flexibility of end users and personal touch is lost. At the same time the communication is set up new challenges which have to be overcome.

This applied research was able to meet its objectives and therefore cover the topic of engaging business users to BICC quite widely. Due to the practical approach this research was able to provide managers different guidelines and viewpoints to engaging business users to centralized BI. The descriptive narratives of two different BI development projects give both managers and academics a good exploratory view to BI development project management which has not been written much about. The generalizability of the results is relatively weak due to the case research method but the research showed that the topic itself is worth of further research. To increase the credibility of the results more research should be conducted using different methods or perhaps triangulation.

This research showed that offering a superior BI solution one can create very good base for change that prevents the further pain and makes the change management easier. However, one cannot generalize that superior solution is always the key to success.

Because cases, environments and methods vary a lot, one should try to find out which means and methods of engaging are most powerful under different conditions. The spectrum of change management means and methods is so huge that managers start to be confused with all the variety of the ways. More efforts should be put to examine engagement people in more detailed contexts.

During this research the particular BICC was relatively young and it was still putting most of its efforts to expand the user base. However, as the time goes by and the maturity of BICC increases the user base will expand and BICC's coverage will get bigger and more people are offered sophisticated BI solutions. One can suppose that the awareness of BI solutions increases in organization but the standardization has to be even stricter and people's expectations will increase. How would the engagement of business users differ in those conditions? This research was able to reveal the change only during the time of one and half year. The change of engaging business users as the maturity of BICC increases should be researched during longer periods and also in more mature environments. Like Kurt Lewin proposed already over 50 years ago, interpersonal relationships and social interaction are very important things to be considered during the change process. People's awareness, readiness and different opinions of the change spread well by word of mouth. The research of engaging business users to BICC should not be limited only in the research field of organizational change management but it should be covered also by social study researches.

BIBLIOGRAPHY

Aldag, R.J. & Stearns, T.M. 1991. Management (Second edition). Cincinnati, South-Western Publishing.

Amis, J., Slack, T., Hinings, C.R. 2004. The Pace, Sequence, and Linearity of Radical Change. The Academy of Management Journal. Vol. 47, No. 1, pp. 15-39.

Armenakis, A.A. & Bedeian, A.G. 1999. Organizational Change: A Review of Theory and Research in the 1990s. Journal of Management. Vol. 25, No. 3, pp. 293-315.

Baars, H., Zimmer, M., Kemper, H-G. 2009. The Business Intelligence Competence Centre as an Interface Between IT and User Departments in Maintenance and Release Development. 17th European Conference on Information Systems, Verona, 2009, 12 p.

Ballard, C., White, C., McDonald, S., Myllymäki, J., McDowell, S., Goerlich, O., Neroda, A. 2005. Business Performance Management… Meets Business Intelligence. IBM International Technical Support Organization. Red Book. July 2005. 204 p.

BARC. 2008. Organization of Business Intelligence. BARC Institute, Wurzburg.

Barlow, S. 2006. Virtual Business Intelligence. Best Practices in Business Intelligence 2006 Awards Program.

Barr, P.S., Stimpert, J.L., Huff, A.S. 1992. Cognitive change, strategic action, and organizational renewal. Strategic Management Journal. Vol. 13, special issue, pp. 15-36.

Bashein, B.J. & Markus, M.L. 1997. A Credibility Equation for IT Specialists. Sloan Management Review. Vol. 38, No. 4., pp. 35-44.

Bhushan, N. & Rai, K. 2004. Strategic Decision-making. London, Springer, 200 p.

Bitterer, A., Schlegel, K., Hostmann, B. et al. 2007. Hype Cycle for Business Intelligence and Performance Management. Gartner Research. Published 23 July 2007, ID Number: G00149421.

Boeker, W. 1997. Strategic change: the influence of managerial characteristics and organizational growth. Academy of Management Journal. Vol. 40, No. 1, pp. 152-170.

Burnes, B. 2004. Kurt Lewin and the Planned Approach to Change: A Re-appraisal. Journal of Management Studies. Vol. 41, No. 6, pp. 977-1002.

Burstein, F. & Holsapple, C.W. 2008. Handbook On Decision Support Systems 2. Berlin, Springer, 800 p.

BusinessDictionary. 2010. Online Business Dictionary. Available: http://www.businessdictionary.com/definition/key-performance-indicators-KPI.html. Referred 14 April 2010.

Chew, R., Ericsson, L.M., Fuchs, G. 2007. Enterprise-Level BI. BIReview. September 2007, pp. 6-9.

Cognos. 2006. BI Centres of Excellence. DWAA QLD Meeting 01/06/2006. Available: www.dwaa.org.au/Papers/Cognos___BICC.pdf. Referred 23 March 2010.

Computerworld. 2006. How Companies Are Implementing Business Intelligence Competency Centers (BICCs). White Paper.

Conner, K. R. & Prahalad C. K. 1996. A Resource-Based Theory of the Firm: Knowledge versus Opportunism. Organization Science. Vol. 7, No. 5, pp. 477-501.

De Voe, L. & Neal, K. 2005. When Business Intelligence Equals Business Value. Business Intelligence Journal. Vol. 10, No. 3, pp. 57-63.

de Wit, M. & Meyer, R. 2005. Strategy Synthesis: Resolving Strategy Paradoxes to Create Competitive Advantage (Concise Version). Singapore, Seng Lee Press, 295 p.

Dent, E.B. & Golberg, S.G. 1999. Challenging "Resistance to Change". The Journal of Applied Behavioral Science. Vol. 35, No. 1, pp. 25-41.

Dubrin, A.J. & Ireland, R.D. 1993. Management and organization (Second edition). Cincinnati, South-Western Publishing.

Eckerson, W. 2003. Understanding Business Intelligence. The Data Warehousing Institute. 17 October. Available: http://www.tdwi.org/research/display.aspx?ID=6838. Referred: 14 June 2010.

Economist. 2010. Migration in China: Invisible and heavy shackles (Print edition). May 2010, pp. 8-14.

Eisenhardt, K. M. 1989. Building theories from case study research. Academy of Management Review. Vol. 14, No. 4, pp. 532-550.

Feeny, D.F. & Willcocks, L.P. 1998. Core IS Capabilities for Exploiting Information Technology. Sloan Management Review. Vol. 39, No. 3, pp. 9-21.

Fiol, C.M. 2002. Capitalizing on Paradox: The Role of Language in Tranforming Organizational Indetities. Organization Science. Vol. 13, No. 6, pp. 653-666.

Folger, R. & Skarlicki, D.P. 1999. Unfairness and resistance to change: hardship as mistreatment. Journal of Organizational Change Management. Vol. 12, No. 1, pp. 35-50.

Frantz, D.W. 2004. Change management. Encyclopedia of Leadership. Thousand Oaks, Sage Publications, 1927 p.

Friedman, T. & Hostmann, B. 2004. The Cornerstones of Business Intelligence Excellence. Research Note. 26 April 2004.

Gartner. 2010. The Gartner Fellows: Howard Dresner's Biography. Available: http://www.gartner.com/research/fellows/asset_79427_1175.jsp. Date of access: April 13, 2010.

Goodstein, L.D. & Burke, W.W. 1991. Creating successful organization change. Organizational Dynamics. Vol. 19, No. 4, pp. 5-17.

Graham, P. 2008a. Organizational Considerations for Information Empowerment, Part 1. DM Review. June 2008, p. 31.

Graham, P. 2008b. Organizational Considerations for Information Empowerment, Part 2. DM Review. July 2008, pp. 30-31.

Greenwood, R. & Hinings, C.R. 1996. Understanding Radical Organizational Change: Bringing together the Old and the New Institutionalism. The Academy of Management Review. Vol. 21, No. 4, pp. 1022-1054.

Griffin, R. W. 1993. Management (Fourth edition). Boston, Houghton Mifflin.

Henschen, D. 2008. Seven Steps to Successful BI Competency Centers. Intelligent Enterprise. 24 August 2008. Available: http://intelligent-enterprise.informationweek.com/showArticle.jhtml;jsessionid=JMU1E4UO1ZUODQE1GHOSKH4ATMY32JVN?articleID=210200396. Referred: 23 March 2010.

Hitachi. 2009. Establishing a Business Intelligence Competency Center (BICC). White Paper.

Hostmann, B. 2007. Business Intelligence Trends, with Gartner analyst. 20 March 2007. Available: http://searchbusinessanalytics.techtarget.com/podcast/Business-intelligence-trends-with-Gartner-analyst-Bill-Hostmann. Referred 12 April 2010.

HP. 2009. Building the Business Intelligence Competency Center. White Paper.

IBM. 2009a. BI for business users: How IT can make business intelligence easy for everyone. Whitepaper.

IBM. 2009b. Building a Business Intelligence Competency Center. White Paper.

Inmon, B. 1999. Data Mart Does Not Equal Data Warehouse. InfoManagement Direct. November 1999. Available: http://www.information-management.com/infodirect/19991120/1675-1.html. Referred April 17, 2010.

Isern, J. & Pung, C. 2007. Harnessing energy to drive organizational change. McKinsey Quarterly. Vol. 17, No. 1, pp. 9-17.

Kasanen, E., Lukka, K., Siitonen, A. 1993. Konstruktiivinen tutkimusote liiketaloustieteessä (in Finnish). Liiketaloudellinen aikakauskirja. 3/1991, pp. 301-329.

Kelly, J. 2009. IBM, Microsoft and Oracle top Gartner's business intelligence platform rankings. SearchBusinessAnalytics.com. 29 Jan 2009. Available: http://searchbusinessanalytics.techtarget.com/news/1507124/IBM-Microsoft-and-Oracle-top-Gartners-business-intelligence-platform-rankings. Referred: 12 May 2010.

Kogut, B. & Zander, U. 1992. Knowledge of the Firm, Combinative Capabilities, and the Replication of the Technology. Organization Science. Vol. 3, No. 3, pp. 383-397.

Kotter, J.P. 1995. Leading Change: Why Transformation Efforts Fail. Harvard Business Review. Vol. 73, No. 2, pp. 59-67.

Kreitner, R. 1992. Management (Fifth edition). Boston, Houghton Mifflin.

Lawrence, P.R. 1954. How to deal with resistance to change. Harvard Business Review. May/June, pp. 49-57.

Lönnqvist, A. & Pirttimäki, V. 2006. The Measurement of Business Intelligence. Information Systems Management. Vol. 23, No. 1, pp. 32-40.

Maurer, R. 1996. Using resistance to build support for change. The Journal for Quality and Participation. Vol. 19, No. 3, pp. 56-66.

McKnight, W. 2007. Moving Business Intelligence to the Operational World, Part 1. DM Review. Vol. 17, No. 8, p. 28.

Metso. 2010. The world shapes us - Annual report 2009. Available: http://metso.com/corporation/ir_eng.nsf/WebWID/WTB-100305-2256F-1D6C7/$File/metso_annual_report_2009_english.pdf. Referred: 28 June 2010.

Miller, G.J., Bräutigam, D., Gerlach, S.V. 2006. Business Intelligence Competency Centers: A Team Approach to Maximizing Competitive Advantage (First edition). New Jersey, John Wiley & Sons Hoboken Inc., 198 p.

Nadler, D.A. & Tushman, M.L. 1989. Organizational Frame Bending: Principles for Managing Reorientation. The Academy of Management Executive. Vol. 3, No. 3, pp. 194-204.

Pardo del Val, M. & Martinez Fuentes, C. 2003. Resistance to change: a literature review and empirical study. Management Decision. Vol. 41, No. 2, pp. 148-155.

Pettigrew, A.M., Woodman, R.W., Cameron, K.S. 2001. Studying Organizational Change and Development: Challenges for Future Research. The Academy of Management Journal. Vol. 44, No. 4, pp. 697-713.

Piderit, S.K. 2000. Rethinking Resistance and Recognizing Ambivalence: A Multidimensional View of Attitudes toward an Organizational Change. The Academy of Management Review. Vol. 25, No. 4, pp. 783-794.

Pinnington, A. & Edwards, T. 2000. Introduction to Human Resource Management (Paperback). New York, Oxford University Press, 318 p.

Prahalad, C. K. & Hamel, G. 1990. The Core Competence of the Corporation. Harvard Business Review. Vol. 68, No. 3, pp. 79-92.

Quinn, J. B. 1992. The intelligent enterprise a new paradigm. The Executive. Vol. 6, No. 4, pp. 48-63.

Ranjan, J. 2008. Business justification with business intelligence. The journal of information and knowledge management systems. Vol. 38, No. 4, pp. 461-475.

Reich, B.H. & Benbasat, I. 2000. Factors That Influence the Social Dimension of Alignment between Business and Information Technology Objectives. MIS Quarterly. Vol. 24, No. 1, pp. 81-113.

Robbins, S.P. 2003. Organizational Behavior (Tenth edition). New Jersey, Prentice Hall, 675 p.

Rockart, J.F., Earl, M. J., Ross, J.W. 1996. Eight Imperatives for the New IT Organization. Sloan Management Review. Vol. 38, No. 1, pp. 43-55.

Ruddy, J. 2006. Top 10 Trends in Business Intelligence, part 2. 18 October 2006. Available: http://www.b-eye-network.co.uk/view/3444 Referred: 12 April 2010.

Rytkölä, T. 2010. IBM Cognos solution for Business Intelligence and Financial Performance Management. Lecture slides. 30 March 2010. Not available.

SAS. 2006. Business Intelligence Competency Centers: Creating a successful business intelligence strategy with SAS. White Paper.

Saunders, M., Lewis, P., Thornhill, A. 2009. Research Methods for Business Students (Fifth edition). England, Pearson, 614 p.

Schaffer, R.H. & Thomson, H.A. 1992. Successful Change Programs Begin with Results. Harvard Business Review. Vol. 70, No. 1, pp. 80-89.

Schein, E.H. 1985. Organizational Culture and Leadership. Finnish translation by Liljamo, R. & Miettinen, A. 1987. Organisaatiokulttuuri ja johtaminen. Espoo, Weilin+Göös, 356 p.

Schein, E.H. 1996. Kurt Lewin's change theory in the field and in the classroom: Notes toward a model of managed learning. Systemic Practice and Action Research. Vol. 9, No. 1, pp. 27-47.

Schermerhorn, J.R. 1989. Management for productivity (Third edition). New York, John Wiley.

Sherman, R. 2003a. How to Satisfy Business Users Every Time and Make Them Beg for More, Part 1. Information Management Online. Sep 25. Available: http://www.information-management.com/news/7448-1.html. Referred: April 12, 2010.

Sherman, R. 2003b. How to Satisfy Business Users Every Time (Business User Myths), Part 2. Information Management Online. Dec 4. Available: http://www.information-management.com/news/7818-1.html. Referred: April 12, 2010.

Sherman, R. 2004. How to Satisfy Business Users Every Time (Business User Myths), Part 3. Information Management Online. March 25 2004. Available: http://www.information-management.com/news/1000666-1.html. Referred: April 12, 2010.

Stevenson, W.J. 2007. Operations Management (Ninth edition). McGraw-Hill/Irwin, New York, 903 p.

Strange, K.H. & Hostmann, B. 2003. BI Competency Center Is Core to BI Success. Gartner Research. Published 22 July 2003, ID Number: AV-20-5294.

Strebel, P. 1994. Choosing the right change path. California Management Review. Vol. 36, No. 2, pp. 29-51.

Tellis, W. 1997. Introduction to Case Study. The Qualitative Report. Vol. 3, No. 2. Available: http://www.nova.edu/ssss/QR/QR3-2/tellis1.html. Referred: 19 July 2010.

Tushman, M.L., Newman, W.H., Romanelli, E. 1986. Convergence and Upheaval: Managing the Unsteady Pace of Organizational Evolution. California Management Review. Vol. 29, No. 1, pp. 583-594.

Veryard, R. 2005. Service Orientated Business Intelligence 2. 22 September 2005. Available: http://rvsoapbox.blogspot.com/2005/09/service-oriented-business-intelligence_22.htm. Referred: 12 April 2010.

Waddell, D. & Sohal, A.S. 1998. Resistance: a constructive tool for change management. Management Decision. Vol. 36, No. 8, pp. 543-548.

Weick, K.E. & Quinn, R.E. 1999. Organizational change and development. Annual Review of Psychology. Vol. 50, No. 1, pp. 361-386.

White, C. 2006. The Next Generation of Business Intelligence: Operational BI. White paper.

Wu, L., Barash, G., Bartolini, C. 2007. A service-oriented architecture for business intelligence. IEEE International Conference on Service-oriented Computing and Applications, SOCA 2007, pp. 279-285.

Yin, R.K. 2009. Case Study Research: Design and Methods. Fourth edition. California, Sage Publications, 219 p.

Yukl, G.A. 2001. Leadership in Organizations (Fifth edition). New Jersey, Prentice Hall, 508 p.

APPENDICES (2 pieces)

APPENDIX 1: Extract from PAS management reporting interview notes

28 June 2010, PAS management reporting (pilot BI project), project manager interview notes

Original scope / timetable; how did the actual go against the plan?

- Started in February-March 2009, End of May in production
- HFM AUTOMMA & PASPG, nykyiset kuutiot ja dashboardit
- Initiative and promotion by project manager and VP of Business Controlling

Contact persons

- "PAS general Controller" (compare FC's corresponding; HFM know-how)

Users

- Expanded PAS management board (product lines, service, regions, HR, operations logistics, product line controllers x3)
- Dashboards to all, cubes to controllers
- Later little expansion to service and countries

Earlier reporting

- Mailed / database Excels, PowerPoints by Controllers

Communications

- Promotion by initiators, personal touch and encounter

Trainings

- Not organized, only if needed
- Dashboard review at management board's meetings
- OLAP cubes were trained by project manager

Other

- People may fear the burden that they will have to carry when new solution is implemented?
    - "General Controller" was the only one whose workload increased and at the same time she did not personally benefit from the solution itself → may cause dissatisfaction
- After the project?
    - There has not been time to do any further development or major expansion of user base
- Contact person, who is he? Importance to organization? Opinion leader?
    - VP of Business Controlling has very strong experience of reporting
- A new tool AGAIN? Has there been too much to learn or has the environment been chaotic?
    - No significant changes in near past

APPENDIX 2: Extract from miscellaneous observation notes of multiple meetings

9 March 2010, Reporting Workshop

- Training session for PAS and FC controllers to use reporting tool
- Information about future reporting (what will be done and when)

22 March 2010, GBI project operations module meeting

- Change resistance: old OLAP cubes and reports in North America implementation
- Importance of strong business management support: Quick stop to rival reporting - high level support is needed

14 April 2010, Another project's meeting

- Advance information is important, however there is a trade-off: one must be 100 % sure that things will happen and there will be something concrete to show
- In global centralized projects processes can be forced in new shape because decision is made on top-level, otherwise it can be hard to change processes (for example data validation and analyze before data extractions)

16 April 2010, FC management reporting project meeting

- Engaging business users to testing phase has a challenge to be sure that users have enough time. One must have clear "time reservations" to ensure that
- If every little thing starting from naming practices are standardized, how end users will react?